December 14, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

IN TWO SECTIONS ESTABLISHED 1882 SECTION ONE

THE COLD METAL PRODUCTS CO.

SUBSIDIARY OF THE COLD METAL PROCESS COMPANY

YOUNGSTOWN • OHIO

CMP

PRECISION COLD ROLLED

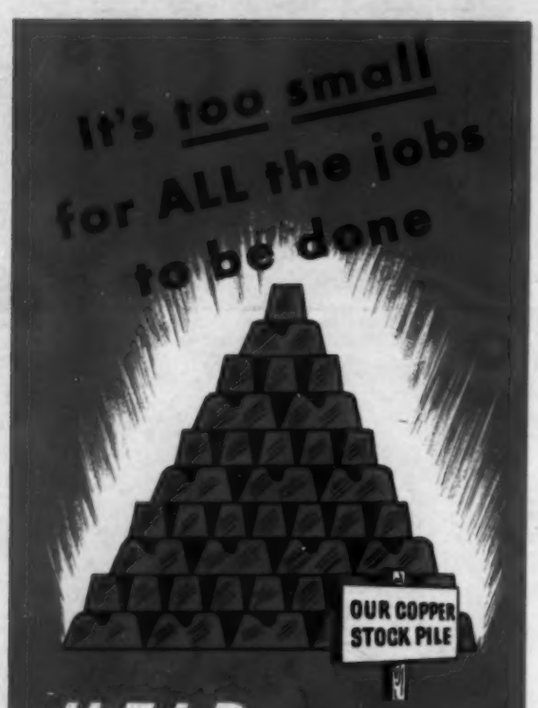
STRIP STEEL

MORE PRODUCTION PER TON

for many of

AMERICA'S VITAL WAR INDUSTRIES

MAKE ANOTHER SEARCH TODAY . . . GET IN THE SCRAP!



HELP S-T-R-E-T-C-H IT

Consider these things when figuring motor sizes

Don't overlook this hidden factor

Both N.E.M.A. and A.S.A. Standards specify that general-purpose electric motors shall be suitable for carrying CONTINUOUSLY a load of 1.15 times the rated load. Thus, a 5 hp. motor can carry 5¾ hp.

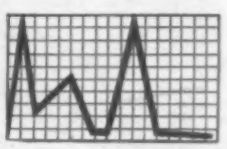
Make use of this. Save a frame size and S-T-R-E-T-C-H vital materials — copper, steel, aluminum.

WITH *copper* one of our most critical materials it's *our* job and *your* job to see that it gets to the spot where it does the most damage to our enemies. You want more motors. We shall have less copper for building them.

Here are some of the things that can be done about it:

Make more careful studies of machine loads. Don't over-motorize just to "play safe." We are in a spot where we must do some conservative gambling.

CHECK DUTY CYCLE . . . . Maybe an intermittent-duty motor will do, using a frame size smaller than the continuous-duty motor.



CHECK TORQUE REQUIREMENTS. Maybe a motor with special torque characteristics will take a frame size smaller and save vital materials.

CHECK SPEEDS. If it's a constant-speed motor, save a frame size by going to next higher speed, 1200 rpm. instead of 900 rpm.; 1800 rpm. in place of 1200 rpm.

If it's an adjustable-speed d-c. drive, can you get by with a higher minimum speed? A 1 to 3 range instead of 1 to 4? For example, using 500-1500 rpm. in place of 400-1600 rpm. saves a frame size.

Could you get along with a single-speed a-c. motor or a single-winding multi-speed motor instead of a two-winding multi-speed motor?

CHECK VOLTAGES. Specify single-voltage a-c. motors. They use but 3 leads instead of 9.

This job involves Application Engineering, which is our business. Reliance men skilled in this work are ready to help and are available in the industrial centers listed below.

RELIANCE ELECTRIC & ENGINEERING COMPANY
1088 IVANHOE ROAD • CLEVELAND, OHIO

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • DETROIT
GREENVILLE, S. C. • HOUSTON, TEXAS • LOS ANGELES • MINNEAPOLIS
NEW YORK • PHILADELPHIA • PITTSBURGH • PORTLAND, ORE. • ST. LOUIS
SAN FRANCISCO • SYRACUSE, N. Y. • AND OTHER PRINCIPAL CITIES

RELIANCE A-C D-C MOTORS

PROTECT the Employee and SPEED Production—

For 27 years Bethlehem has been waging war on the most dangerous saboteur of industrial production—accidents. Today, with the future of the nation so dependent upon top-speed production of war steel, we are stepping up the safety and first-aid effort on a widening scale.

First-aid instruction is being given to thousands of employees. Established safety practices are daily being intensified. More safety shoes, goggles, helmets, respirators and fire-proof clothing. More warning signs and flags to mark danger spots. More safety posters to keep workers safety-conscious. . . . No detail is overlooked which can possibly contribute to the fast, efficient, *safe* production of steel for America's ever-growing war needs.

TOE-SAVING SHOES—Each of these five steel-reinforced safety shoes saved a foot from painful injury and kept one more worker on the job, fit, and able to continue doing his share to keep up the flow of Bethlehem's war production.

DANGER SPOT—But it's been rendered harmless by a short railing and a sign. Instead of stepping out blindly from the corner of the building, workers must cross the track at a point where they can hardly fail to notice an approaching train.

REHEARSAL—This team of first-aid men is giving treatment to an accident "victim" at one of Bethlehem's first-aid contests, held annually for many years. Thanks to this training, thousands of Bethlehem-trained first-aiders are constantly on the alert in steel plants and mines to prevent or treat industrial accidents.

BETHLEHEM STEEL

SAFETY SCHOOL—By movies and lectures, Bethlehem employees are continuously being trained in the safest, most efficient methods of handling their jobs. Year after year, this education in the safe way to do every job goes steadily forward.

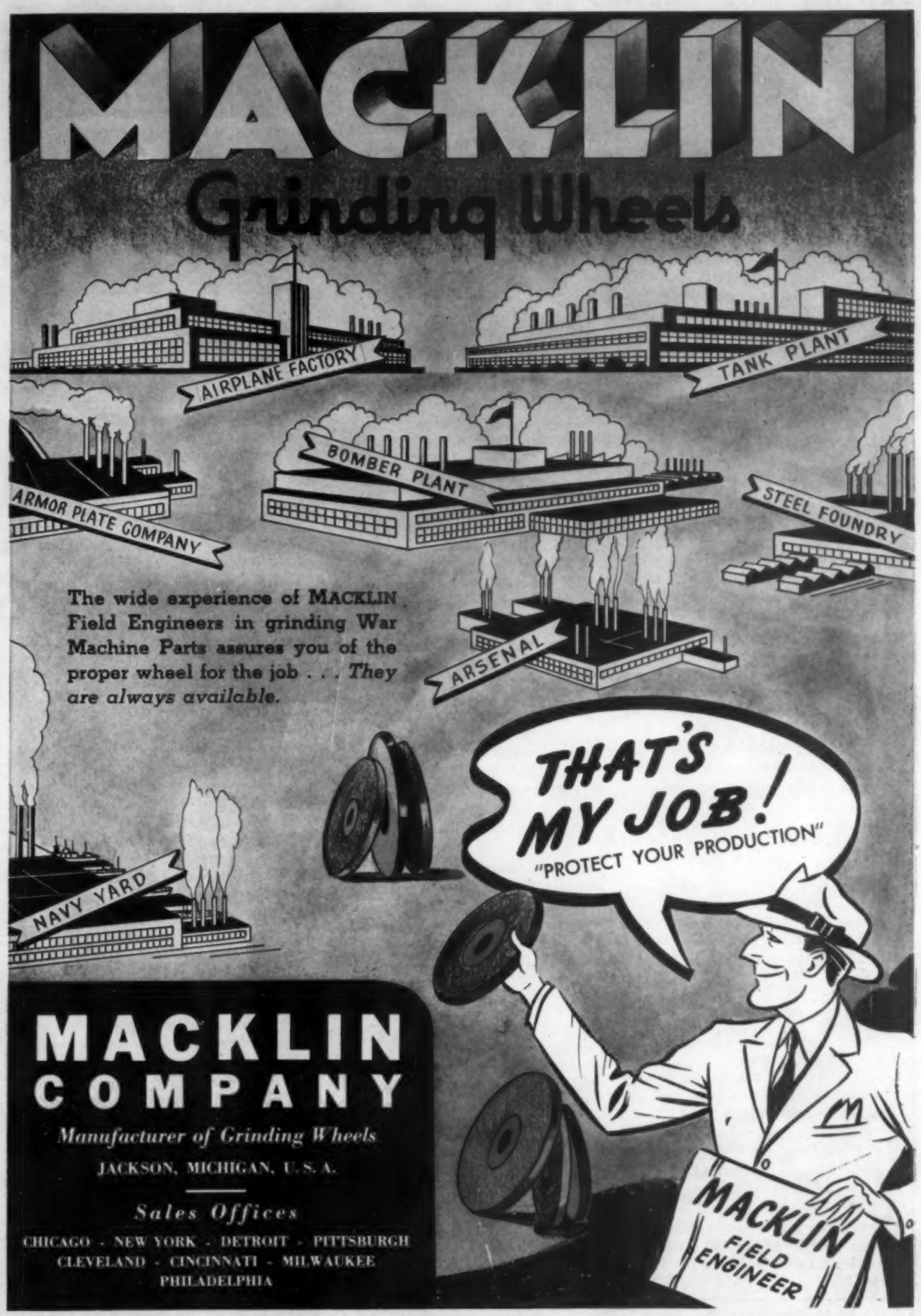
Six keyways are broached in naval ring component on the Standard AMERICAN H - 15 - 60 broaching machine shown at the right. The six equally spaced keyways are 1″ wide, ¼″ deep and tolerance of .001 is maintained.

After one keyway is broached the part is indexed and the broach manually returned to starting position. The next keyway is then broached. This process is repeated until all keyways are completed. Only a special fixture was necessary to adapt a standard machine to this operation.

AMERICAN BROACH & MACHINE COMPANY
ANN ARBOR, MICHIGAN, U. S. A.
BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY

Division of SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U.S.A.

MACKLIN
Grinding Wheels



The wide experience of MACKLIN Field Engineers in grinding War Machine Parts assures you of the proper wheel for the job . . . *They are always available.*

MACKLIN COMPANY

Manufacturer of Grinding Wheels

JACKSON, MICHIGAN, U. S. A.

Sales Offices

CHICAGO - NEW YORK - DETROIT - PITTSBURGH
CLEVELAND - CINCINNATI - MILWAUKEE
PHILADELPHIA

BEHIND THE SCENES

Two-Way Service

■ C. R. Baxter, Chief, Materials Redistribution Branch, WPB, writes:

You are doing a fine job in interpreting our objectives to your readers, and I was particularly interested in the article which you published about our Branch in your issue of November 2.

Throughout WPB, OPA, OEM, and the Ordnance offices in Washington STEEL is being used every week by the men who are organizing and directing the production program. STEEL performs a two-way service, to keep industry informed on government regulations and to give the government officials an accurate and authoritative picture of industry at war. That is what Donald Nelson meant when he called business papers the "direct line of communication between government and industry."

Additional Priority Guides

■ This week STEEL publishes a completely new and revised edition of its now famous guide to Priorities, Allocations and Prices. As well as an index to government orders, digest of the orders and price schedules, and a directory of WPB and OPA personnel, it includes complete instructions on the new Controlled Materials Plan (CMP).

Additional copies (up to 10) are available to regular subscribers free of charge or in quantities at 10c each. Please send your request to Readers Service Department, Penton Building, Cleveland.

Vicious Circle

■ In these days of manpower shortages this fable of the Indian tickled our funnybone.

The redskin was dozing peacefully at the door of his tepee, while his squaw did all the work, when along came a bustling super business magnate hunting men.

"Chief," said the tycoon, "Why don't you come into town and get yourself a job in the factory?"

The Indian opened one eye lazily and contemplated his questioner, closed his eye again and said: "Why?"

"Well," went on the magnate enthusiastically, "you could earn big money these days, maybe 75c, 85c an hour. Maybe $40 or $50 a week."

This time the Indian didn't bother to open his eye. He just said, "Why?"

"Why look man, if you worked hard and saved your money, pretty soon you'd have a bank account. Wouldn't you like a bank account?"

"Why?"

"Well," said the big shot, "with a big bank account you could retire and you wouldn't have to work any more . . . "

The Indian opened his eye. "No working now," he said.

Forging Handbook

■ STEEL's reprint handbook, "Improved Forging Technique" was delayed some in printing but will be available within a few days. Copies will be mailed just as soon as they come in to those whose orders have already been placed. The books sell for $1.00 per copy.

Introducing . . .

■ In charge of the Editor's Roundtable this week is Steel Plant Editor John D. Knox, known to his friends as Jack, and he has many of them. Jack worked in a steelworks laboratory during summer vacations back right after the turn of the century and then went on to study chemistry at Pennsyvania State College and Cornell University. He became a steelworks chemist in 1910 at Lackawanna, and served in the same capacity at Canton and New Castle, then going to Cleveland where he operated a blast furnace.

Mr. Knox joined STEEL's staff as associate editor during the last war and has seen the industry more than double its capacity in the twenty five years since, only to find today it still isn't quite enough.

One War Ago

■ And twenty-five years ago STEEL carried this item:

In the first nine months of 1917 *six principal Japanese shipyards launched* 48 *merchant ships with a total tonnage of* 208,800.

In the first nine months of 1942—?

Definition

■ A conference is a meeting at which people talk about things they should be doing.

THE EDITORS' *Roundtable*

John D. Knox
Steel Plant Editor

Walk through a mill gate today—any mill gate, it doesn't make any difference where, just so you have a pass—and right away your ears start to ring in overtones with the shrill blast from those tiny locomotives that switch steel in and out of bessemer and open-hearth shops, or they'll ring with the clang of steel striking the rolls, or with the shriek of the siren warning sweaty men that a drag of steel is about to pass overhead. What you discern is only an echo of what before long will set the nerves of dictators on edge.

Uncle Sam is bending low over his anvil. His forges flare in the midnight hours. Cranes chatter over the runways in his steel plants. Never before in the history of this country has so much steel been shunted over spur tracks on to the main line.

Making steel at the present rate has not been without its problems. Many a drop of perspiration has fallen from the brow of men directing blast furnace, open-hearth and electric furnace operation. Nor were many golf balls lost on the links last summer by these men for they haven't had their noses out of flue dust and mill scale for months.

How to get more iron out of a group of stacks already blowing their heads off, how to get an ample supply of feed and charge ore for decarburizing open-hearth heats, how to get a mound of suitable scrap for the electrodes to work on—these were some of the question marks that threw their shadows across the minds of operators as they sought rest from one round after another of meetings over in the boss' office.

And just such problems as these are the pith and core of an article coming up in the Yearbook of Industry Issue of STEEL—out Jan. 4, 1943. We're just telling you so you'll be on the lookout.

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Editorial Contents—Page 41

An Important Message to All Turret Lathe Users:

Don't Buy Standard Turret Lathe Tools Unless You Need Them *Now!*

There is a definite shortage of Turret Lathe Tools to equip machines for vital War Production.

Return For Credit Surplus New Warner & Swasey Tools

Defense Plant Corporation will authorize the return of surplus materials. Present shortages cover practically all standard tools shown in Warner & Swasey Tool Catalog No. 38. Greatest shortages are on the following items:

Single Cutter Turners **Multiple Turning Heads (All Types)**
Slide Tools (All Types) **Adjustable Turning Heads**
Angle Cutter Holders (All Types)

Return for credit any new Warner & Swasey tools. For instructions write or phone the nearest Warner & Swasey office:

Boston . . . . . Kendall Square Building, 238 Main St., Cambridge, Mass.
Buffalo . . . . . Iroquois Building, Church and Franklin St.
Chicago . . . . . 618 W. Washington Blvd.
Cleveland . . . . 5701 Carnegie Avenue
Dayton . . . . 436 Mutual Home Building
Detroit . . . . . 1308 Maccabees Building
Houston . . . . . 409 Velasco Street
Los Angeles . . . . 1118 Santa Fe Avenue
Milwaukee . . . . . 818 Wells Building, 324 E. Wisconsin Ave.
Newark . . . American Insurance Building, 15 Washington St.
Philadelphia . . . . . 6910 Market Street, Upper Darby, Penna.
Pittsburgh . . . 505 Medical Arts Building
Syracuse . . . . . 517 Erie Boulevard East

WARNER & SWASEY FOR VICTORY

GRAINAL

Over 300,000 tons of GRAINAL-Treated steels now in the hands of consumers

Leading steel makers now finishing many thousands of tons a month — Rate rapidly rising

Over 3 Years of large-scale commercial use in transmission gears, axles, shafts, spindles and other dynamically stressed parts

for Increasing the Hardening Capacity of Steel

Effects of a High Order

The effect of GRAINAL on hardening capacity is of a sufficiently high order that along with its other merits, GRAINAL may relieve the pressure on many other steel hardening elements which, due to emergency conditions, are in the critical class.

At the same time, GRAINAL makes possible in many steels favorable combinations of engineering properties that cannot be secured by conventional practices. For example, in full hardened steels, GRAINAL produces new and better balances between usually incompatible properties—hardness versus toughness, strength versus impact resistance. In fabrication, GRAINAL-treated steels generally behave better than other steels of the same hardening capacity.

Grainal Simple to Add

GRAINAL treatment is the irreducible minimum in simplicity—a small amount of alloy added after the usual finishing practice.

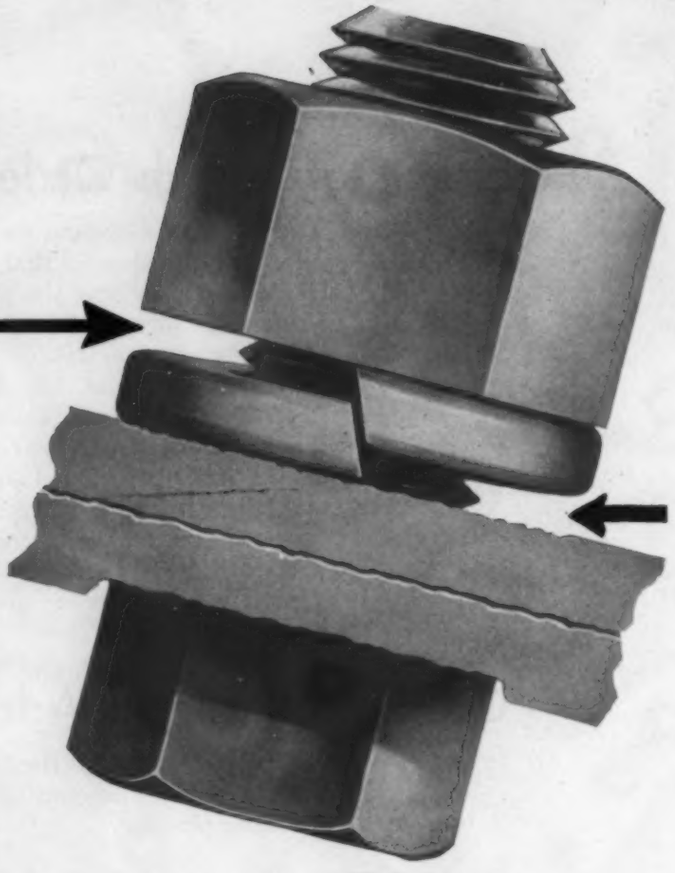
Assures Uniformity of Product

The composition of GRAINAL is "balanced" so that under normal steel making practice, no element can be added in harmful quantities. Greater uniformity of product is thereby assured.

GRAINAL is entirely a "plus value"—a new way to develop unusual properties in quenched and tempered carbon and low-alloy steels.

A little spring can't go a long way

So when you order spring washers specify the ones with long range of spring power



INSIST ON KANTLINKS—the big long-range spring washers that expand and compensate for inevitable wear of bolted parts.... There is no substitute as economical on any assembly that is subjected to vibration. Short-range multi-toothed washers that bite in can not give you the wide expansion range of Kantlinks' **spring power.**

Furthermore, Kantlinks should be used with **every** type of nut, whether a regular standard nut or any one of the many fixed or locked nuts. For even if the nut never budges on the bolt, all other parts of almost every bolted assembly loosen sooner or later **unless** an adequate size helical **spring** washer is used to hold every part tight.

The parts will loosen because of bolt stretch, and frictional wear of metal on metal, burrs and flares, and because of pulverizing of paint, scale, and rust.

This is war time—be safer with powerful Kantlinks.

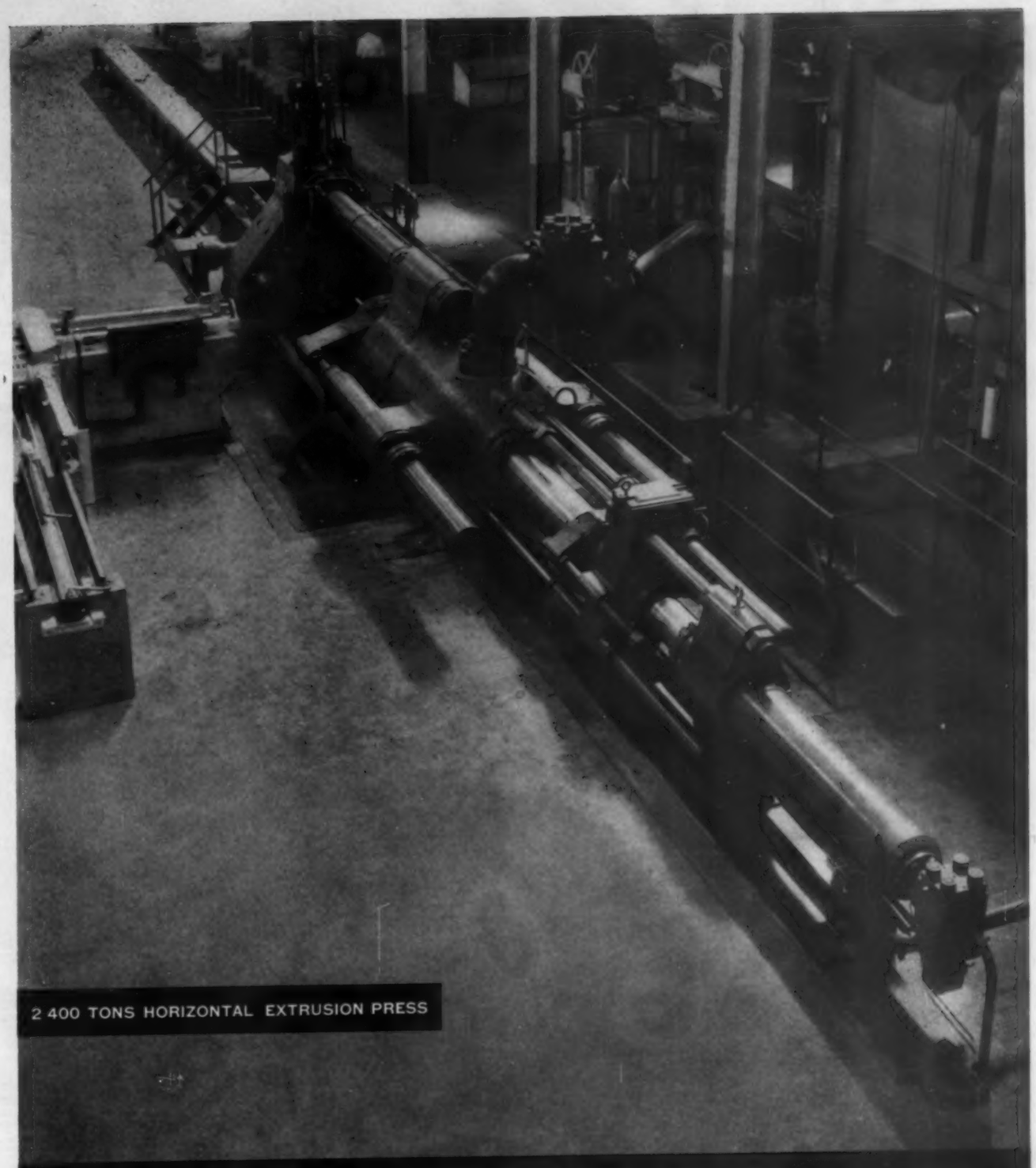
Let us send you samples—send details of your application. Test and compare them on the same job with **any** type of nut, or with any other type of washer. Kantlinks can't lose a real test. Try them for efficiency, economy and real safety.

Write today for descriptive folder.

THE NATIONAL LOCK WASHER COMPANY
NEWARK, N. J., U. S. A.

KANTLINK TRADE MARK

the long-range Spring Washer



HYDROPRESS · INC.

ENGINEERS CONTRACTORS

HYDRAULIC PRESSES · ROLLING MILLS
PUMPS · ACCUMULATORS

570 LEXINGTON AVENUE • NEW YORK • N. Y.

MORE GRINDING
OIL IS AMMUNITION
USE IT WISELY !

FROM FEWER WHEELS...

in less time...

Work spoilage ran high, frequent dressing of grinder wheels was necessary. Rough grinding, centerless grinding and finishing were all slowed down. Then this important defense plant changed to Tycol 665 Oil, a product engineered for grinding.

Work now comes out on schedule. Grinder wheels require fewer re-dressings – last longer. A production leak has been plugged.

This instance is like hundreds of other tough applications where the proper use of Tycol Oils means dollars saved in machining and grinding costs. Tycol cutting lubricants are available to meet all requirements in the machining of both ferrous and non-ferrous metals. Their use assures quality production and better machine efficiency.

Let a Tide Water Engineer show you where economies can be made in your lubrication. Write the Tide Water Associated Oil Company, 17 Battery Place, New York, N. Y.

DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

TIDE WATER ASSOCIATED OIL COMPANY
EASTERN DIVISION: 17 BATTERY PLACE, NEW YORK
Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

New A Reliable

Exclusive

IT'S BUILT AROUND STANDARD STEEL PIPE

...The life and service of which is familiar to every one.

Exclusive

SMOOTH TAPERED FINS SPEED AIR FLOW

...Absence of Crimping Cuts Air Resistance and Dust Accumulation.

FAST-FLOW HEAT TRANSFER

Cross-section illustrates the Sturtevant smooth, tapered fins, secret of the high performance of this new Sturtevant all-steel extended surface. Notice how the fin is shaped to promote equal heat intensity at every point along its section. No crimping to collect dust or impede airflow.

SINGLE-TUBE INTERNAL TUBE CONSTRUCTION FOR HEAVY DUTY

A time-tested form of construction which has given dependable performance for a quarter of a century.

Steel Heater!

STURTEVANT HEAVY-DUTY ALL-STEEL HEATER

—especially suitable for industrial high temperature applications!

It's the result of 3 years' research on steel heating coils. NOT a substitute for shortages—but a radical improvement in extended surface design for *NOW* —and *After the War!*

Featuring standard steel pipe construction to withstand severest services – smooth fins to minimize air flow resistance – tapered fins for fast-flow heat transfer.

FULLY GUARANTEED!

Now, for all heating and drying work, there is no reason to risk early and frequent replacement. Instead, this Sturtevant heavy-duty steel extended surface gives you all the advantages of encased heater sections, is as reliable as the old Sturtevant Pipe Coil Heater, many of which are still in service after more than 50 years of satisfactory operation, and carries the same guarantee which is customary on copper units.

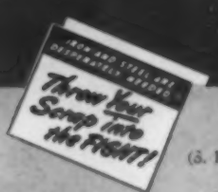
Overcomes many troubles that occur at higher steam temperatures

Need for a heavy-duty all steel surface has always been evident in certain installations where conditions caused corrosion of copper. Here's how the new Sturtevant heavy duty heater licks this problem: Steam is carried in standard steel pipe from the time it enters the heater until it goes back into the condensate line; the unit is as durable as the supply and return lines themselves.

And there are plenty more reasons why this latest Sturtevant development makes front page news in industry;—1, it utilizes a proved principle known as Internal Tube Construction—used by Sturtevant for 25 years; 2, it can be installed either vertically or horizontally, header required only on one end; 3, made in the same standard sizes as copper units—hence requires no more space. Performance and dimension data available on request.

Sturtevant
REG. U. S. PAT. OFF.

Puts Air to Work



(S. 12-42

B. F. STURTEVANT CO.
Hyde Park, Boston, Mass.

I am interested in the new Sturtevant All Steel Heater for the following essential applications_____

_____

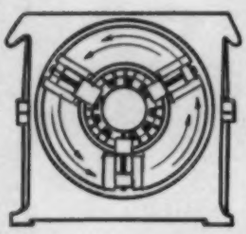
Please send further information to:

Name_____ Title_____

Company_____

Address_____

YODER TUBE *Rotary Cut-off* MACHINE••



This is the Cut-off Machine you have been hearing about so favorably. Its biggest feature is that the TUBING DOES NOT REVOLVE. Consequently, there can be no "whipping" action, even though the tubing is bent.

Also, you're cuts ahead with Yoder's because they are speedier than conventional types of cut-offs. Accurate, of course, and with ruggedness built-in that resists vibration, insuring a long life to machine and tools.

IN IT...THE FEATURE OF ALL FEATURES!

Designed, developed and manufactured by an organization experienced, in general, in the metal forming production machinery field and in particular, in the making of cut-off machines.

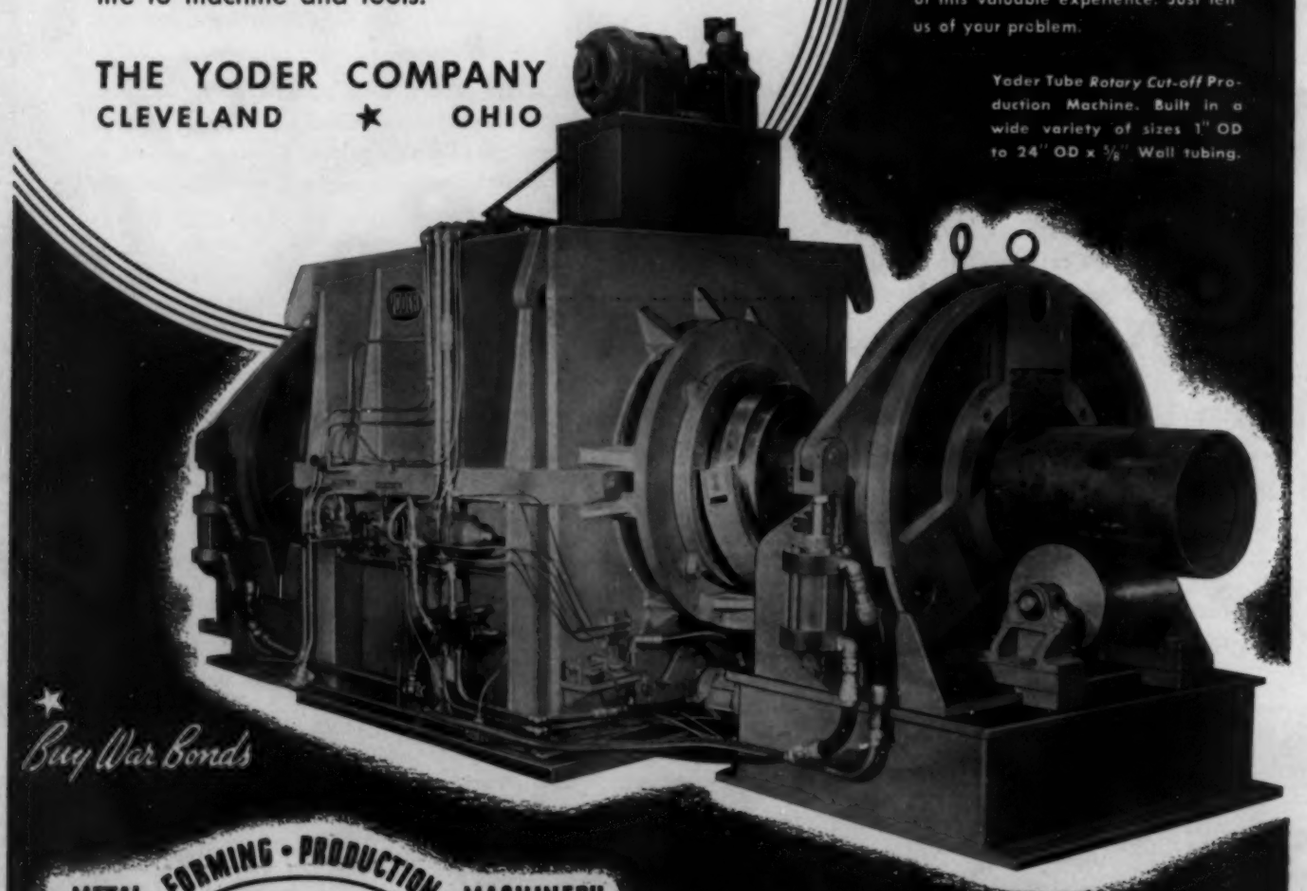
It takes a machine designed for PRODUCTION to get PRODUCTION!

Our customers agree that this experience adds something to these machines.

You are invited to avail yourself of this valuable experience. Just tell us of your problem.

THE YODER COMPANY
CLEVELAND ★ OHIO

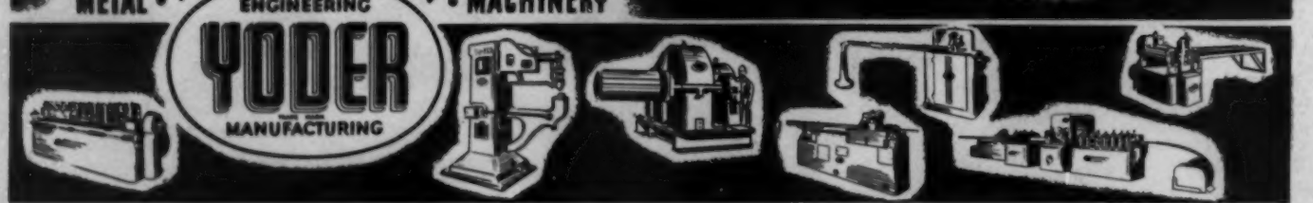
Yoder Tube *Rotary Cut-off* Production Machine. Built in a wide variety of sizes 1" OD to 24" OD x 5/8" Wall tubing.



★ *Buy War Bonds*

METAL • FORMING • PRODUCTION • MACHINERY

ENGINEERING **YODER** MANUFACTURING



SHENANGO-PENN

Centrifugal Castings

MEET EXACTING ARMY, NAVY, AIR CORPS AND ENGINEERS REQUIREMENTS

THE action of centrifugal force gives Shenango-Penn castings greater strength, greater density and greater elongation. In effect, it results in physical characteristics and qualities approaching that of a forging in many alloys.

Our standard alloys, established to meet government and society specifications, will cover all requirements of every industry. For more information on Shenango-Penn centrifugal castings in *all bronzes, monel metal and alloy irons* write or wire today.

Bearings • Bushings • Pump & Cylinder Liners
Rings • Propeller Shaft Sleeves • Washers

SHENANGO-PENN MOLD COMPANY
407 WEST THIRD STREET • DOVER, OHIO
Executive Offices: PITTSBURGH, PA.

Requires Greater Press Capacity

If you are now performing any or all of these operations on BRASS Shell Cases and are required to change over to STEEL Shell Cases, you will need Mechanical Power Presses having approximately 25% greater capacity.

However, in many instances this situation can be met by adding some heavier Mechanical Power Presses to the line and rearranging the sequence of operations.

Our Engineers have made recommendations of this changeover to many Manufacturers of Shell Cases and if you are interested, we suggest that you write us immediately for further information.

BLANKING
CUPPING
DRAWING
HEADING
TAPERING
PIERCING
STAMPING

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY
CLEVELAND, OHIO

NEW YORK · DETROIT · PITTSBURGH · CHICAGO · PHILADELPHIA

FIRTHITE

LEADS THE WAY

TO INCREASED PRODUCTION

Metal Removed with Tungsten Carbide

Metal Removed with Tungsten-Tantalum Carbide

Metal Removed with Tungsten-Tantalum-Titanium Carbide

Metal Removed with Tungsten-Titanium Carbide

1929 **Tungsten Carbide** Tips, brazed to plain carbon-steel shanks, gave greatly increased production in machining cast iron, bronze, and brass—not steel. So Firthite then developed:

1932 **Tungsten-Tantalum Carbide** for faster steel cutting. Certain difficulties of manufacture and use led Firthite next to develop:

1934 **Tungsten-Tantalum-Titanium Carbide** (patent No. 1,973,428 of September 11, 1934). Representing a marked improvement, this type soon became the standard carbide for steel cutting. Seeking further improvement, Firthite next introduced:

1940 **Tungsten-Titanium Carbide.** Tantalum now became unnecessary and merely an added expense to the user. The new development gave better, faster, cheaper steel cutting . . . released thousands of pounds of scarce Tantalum for indispensable uses in the electrical and chemical fields.

TODAY **FIRTHITE TUNGSTEN-TITANIUM CARBIDE LEADS THE WAY!**

Firth-Sterling
STEEL COMPANY

TOOL STEELS AND CARBIDES FOR COMPLETE SHOP TOOLING

Offices: McKEESPORT, PA. NEW YORK - HARTFORD - PHILADELPHIA - CLEVELAND
DAYTON - DETROIT - CHICAGO - LOS ANGELES

"Store welding electrodes in a dry place— they will keep indefinitely if properly cared for"

Always keep electrodes in a dry place — on a clean shelf or rack, or at least off the floor. Don't expose them to moisture, keep them away from sweating pipes and open windows. If by accident a box of electrodes should get wet, spread them out to dry immediately.

Follow these simple precautions together with those enumerated at the right — fight waste to speed victory.

A booklet of shop bulletins illustrating "do's" and "dont's" has been prepared to help your welding operators get the most out of every electrode. We'll gladly send you as many copies as you can use.

WELDING ELECTRODES ARE SCARCE

Help Prevent Waste

- Do not bend electrodes unless absolutely necessary
- Use electrodes down to a 2-inch stub
- Fit joints properly before welding
- Make legs of fillet welds equal
- Make the face of fillet welds flat

Air Reduction

General Offices:
60 EAST 42nd STREET, NEW YORK, N. Y.

IN TEXAS
MAGNOLIA - AIRCO GAS PRODUCTS CO.

AIRCO

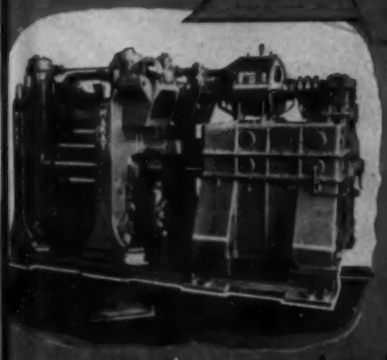
WILSON

OXYGEN IS PRODUCTION — *Don't Waste it!*

The WEAN ENGINEERING COMPANY, Inc. • WARREN, OHIO

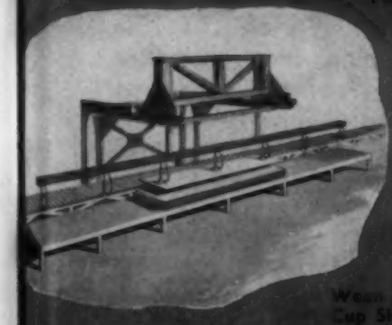
SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT

- ARMOR PLATE LEVELLERS
- HI-SPEED SHEET AND TIN MILL SHEAR LINES
- ELECTROLYTIC & BONDERIZING TIN PLATE EQUIPMENT
- WILSON TUBE ANNEALING FURNACES
- WEAN VACUUM CUP SHEET AND PLATE LIFTERS
- CONTINUOUS STRIP PICKLING SLITTING, SIDE TRIMMING AND RECOILING LINES

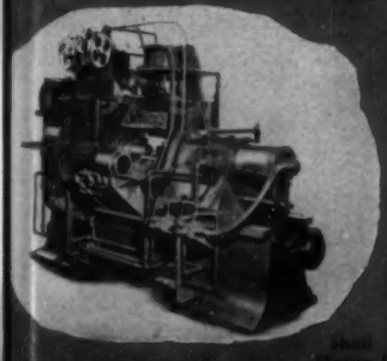


Armor Plate Leveller

Wilson Tube Type Annealing Furnace



Wean Vacuum Cup Sheet and Plate Lifter



Shell and Sleeve Lathe

Subsidiary Company
THE BRODEN CONSTRUCTION CO.
CLEVELAND, OHIO

Associated Companies

LEE WILSON ENGINEERING CO.
CLEVELAND, OHIO

THE McKAY MACHINE CO.
YOUNGSTOWN, OHIO

FLINN & DREFFEIN CO.
CHICAGO, ILL.

THE WELLMAN SMITH OWEN ENGR. CORP., LTD.
LONDON, ENGLAND

THE HALLDEN MACHINE CO.
THOMASTON, CONN.

THE WEAN ENGINEERING CO. OF CANADA, LTD.
HAMILTON, ONT.

facts we learned from boiler tubes can step up your production

Babcock & Wilcox Tube Company developments in the manufacture of seamless steel tubing now permit boilers to operate at 2500 lb. per sq. in. pressure at 1100 F. and higher. The same men, working with the same care, in the same mill that produced those tubes, also produce B&W Seamless Steel Mechanical Tubing. B&W Seamless Mechanical Tubing can be used as machining stock or for structural members in scores of applications.

Drilling and boring operations are simplified, steel is saved and the chip-disposal problem is reduced. Man-*hours* you spend now in re-designing or re-tooling for tubing may soon be saving you man-*days* in production.

When you do turn to tubing, remember that B&W Seamless Mechanical Tubing is produced in a specialty-tube mill where men and machines regularly work to far more difficult specifications than you will require. You can logically expect the best mechanical tubing to come from B&W.

TA-1222

B&W Seamless Steel Mechanical Tubing is available in a wide range of sizes, in carbon steel, National Emergency steels and S.A.E. alloy steels, hot finished or cold drawn, in a variety of tempers. Details in Bulletin TB-319, yours free on request.

BABCOCK & WILCOX TUBES

HOT FINISHED
COLD DRAWN

ALLOY STEELS
CARBON STEELS

THE BABCOCK & WILCOX TUBE COMPANY
BEAVER FALLS, PA.

Continuous Mold Conveyors

many types—for every requirement

● Loaded as they pass the molder's stations—the continuing past the pourers, along the cooling zone to the shakeout, and around again in an endless cycle—Bartlett-Snow Mold Conveyors provide foundry owners and managers with a means of securing a maximum of both quality and quantity from their plants.

With a continuous mold conveyor sand can be reused three, four or more times a day. Flasks can be used over again eight to twelve times each shift. Output per given floor space is much increased. "Overhead" is spread over a larger production resulting in a less costly more salable product.

Bartlett-Snow two wheeled single axle "cars", supported in part by the adjoining the next adjoining car, and four wheeled two axle cars—are available to meet wide variety of size and weight requirements. Car tops can be fitted with gravity rolls if desired to facilitate the loading and removal of large heavy molds,—and cars with special tops, axles, wheels, etc., can be furnished to meet any requirement.

Our recently completed 32 page Foundry Bulletin No. 91 illustrates many different applications of mold conveyors and other Bartlett-Snow Foundry Equipment ... No obligation ... Send for a copy today!

THE C. O. BARTLETT & SNOW COMPANY
6201 Harvard Avenue Cleveland, Ohio
Engineering and Sales Representatives in the Principal Cities

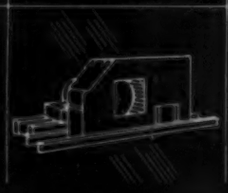
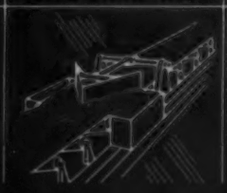
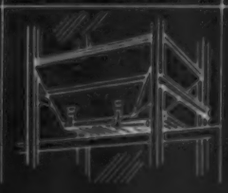
100% War Bond Buyers
Average Payroll Deductions—14%
H. S. Hersey
PRESIDENT

BARTLETT-SNOW

ENGINEERS AND FABRICATORS FOR THE FOUNDRY INDUSTRY

Complete Sand, Mold and Castings Handling Equipment for any requirement, including

Shakeouts	Elevators	Aerators	Sand Distributors	Bins and Feeders	Apron Conveyors	Dust Collectors

THE TWO THINGS YOU MUST KNOW ABOUT THE STEEL YOU NEED TODAY

Is it available? . . .

BECAUSE the steel picture is changing almost day by day, any specific information we could give you in an advertisement might be sadly out-dated by the time you read it.

For that reason we ask you to bring questions covering steel *directly* to our metallurgists.

They are prepared to tell you promptly what standard steels are at any time obtainable—or what alternate steels should be used to best replace those you have been accustomed to using.

They can aid you in revising specifications when such changes are necessary to conserve critical alloying elements.

Their guidance in selecting the proper alloy or carbon steel to suit your needs and in putting it to work with least delay will take into account your plant facilities and will aim to involve the least possible dislocation of your present operating procedures.

Here is practical, time-saving assistance, based on the invaluable experience we have accumulated in the past two years in helping plants of all kinds swing over into war-time production. We gladly place it at your service.

Only by collective cooperation such as this can American industry speed action to obtain the invincible hitting power that will determine how soon the war will end and who will win it.

As a first step on the road to American victory, put your steel problems in our hands, NOW.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

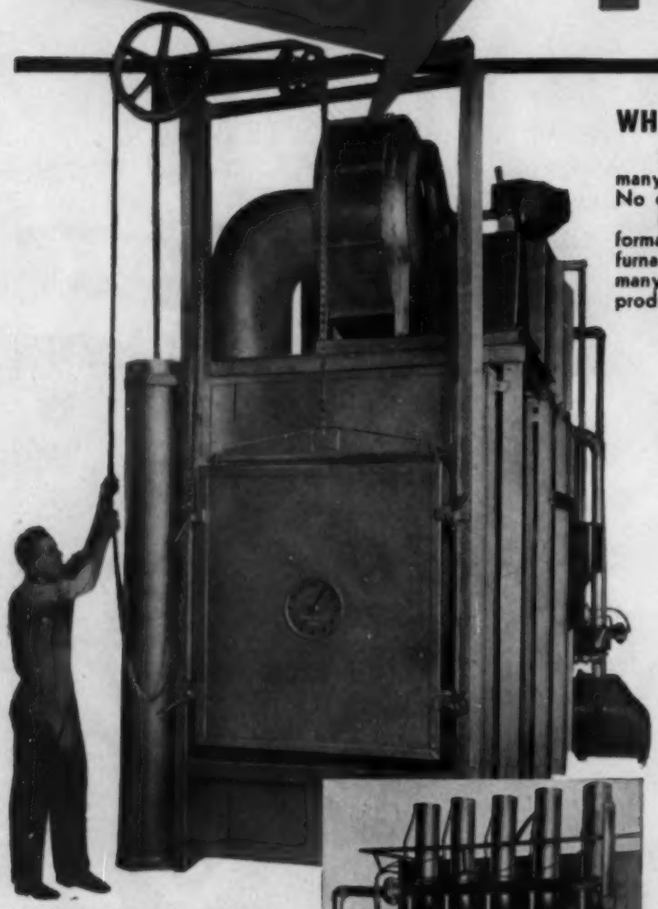
UNITED STATES

If not, what other steel will do the job?

Steels that meet the challenge of today and tomorrow

STEEL

Magnesium HEAT TREATING FURNACES



AIRCRAFT PARTS of magnesium are heat-treated in this Despatch furnace above. Work chamber is 3' x 4' x 8'. Shelf-loading; manual or automatic lift door. Also used for solution and aging of Al. castings.

CLEAN HEAT, free of combustion gases, is supplied by this Despatch [illegible] convection heater. Gas or electric. Very efficient [illegible] for types of [illegible]

WHY YOU CAN DEPEND ON A DESPATCH FURNACE

Successful magnesium heat-treatment with Despatch furnaces in so many large plants doesn't mean we know everything about magnesium. No one does—yet.

But we do know exactly what's needed in furnace design and performance for proper heat-treatment of magnesium. Each Despatch furnace meets all requirements with ease. And in addition each offers many extra features particularly suited to high quality, large-scale production.

These Features Assure Good Results

1. UNIFORMITY ± 5° F. guaranteed throughout entire heat range. Clean, recirculated convection heat, free of fumes, from radiant tube heater. Indirect gas fired. Handles all Mg. or Al. alloys. (Elec. models also available).

2. DEAD SPOTS AVOIDED with controlled airflow from high volume fan. Adjustable ports in heat ducts allow perfect distribution through chamber and load.

3. TIGHT-SEALING throughout allows use of SO_2 gas. Reduces heat loss and improves working conditions.

4. EASY HANDLING provided by wide variety of dependable, smooth operating loading systems to fit all requirements. Saves labor.

5. EFFICIENT FIRING (Gas or Elec.) is obtained throughout entire heat range to give you the most from fuel used. Quick response to control equipment. Elec. systems use long-life elements.

6. MANY SIZES Prompt delivery available for standard sizes 3' x 3' x 3' up to 8' x 7' x 15'. Pot type elec. models in all sizes to 60" diam. by 60" deep (working dimensions).

WIRE OR PHONE for a Despatch engineer. He will recommend a tested and approved standard Despatch magnesium heat-treating furnace for your plant. Free Bulletin 81 just printed; ask for it.

FURNACES FOR OTHER USES—TO 1750°F.
Ask for complete information, photos, etc.

New propeller with a Destiny

After nearly two years of intensive development, Wickwire Spencer announces a revolutionary, *fully* automatic, variable pitch propeller. Now that it has passed repeated tests, and is in production, the news can be told.

In the Wickwire Automatic Propeller the pitch *adjusts itself* for maximum thrust at all airspeeds or altitudes, for all flight conditions. The action is instantaneous, smooth. The propeller is light in weight, simple and dependable in construction. Eliminated are all electrical, hydraulic or mechanical equipment and circuits for changing the pitch.

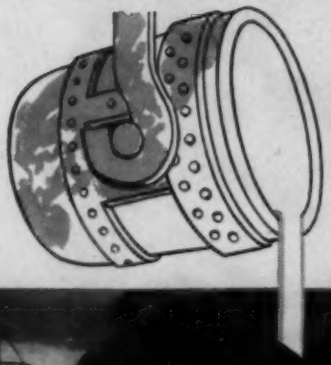
What this engineering accomplishment means: It shrinks take-off distances required, produces faster climb. The highest airplane speed, at any throttle setting, is now obtainable automatically without the pilot's giving it a thought. It also means getting the most air-miles per gallon. By doing away with the need for manual control, it marks a new milestone in safety.

The immediate opportunity for the Wickwire Automatic Propeller is to help win the war. With Victory, its destiny will be to help make the world's peacetime flying simpler, speedier, safer.

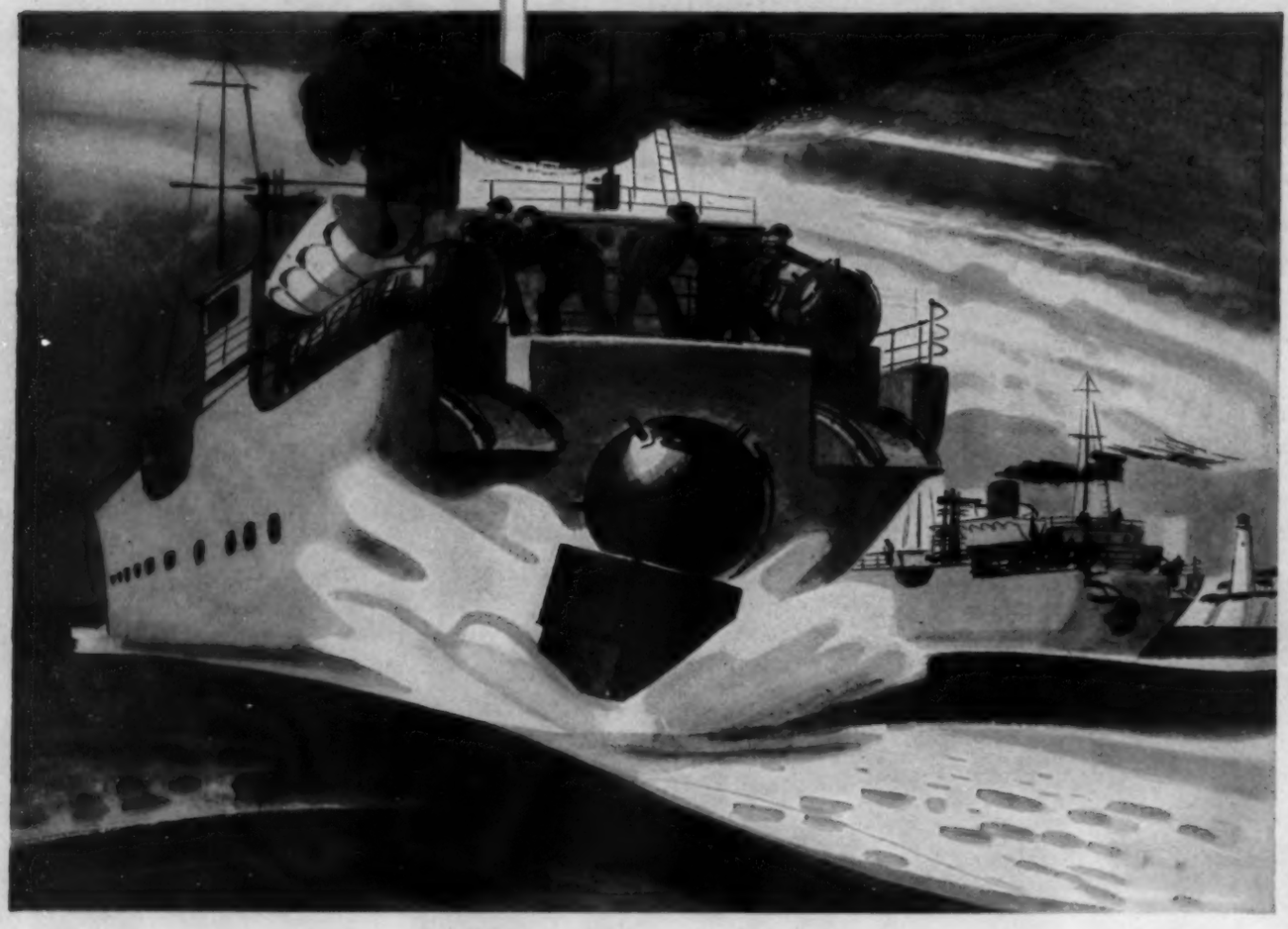
Propeller Division, Wickwire Spencer Steel Company, 500 Fifth Avenue, New York City.

WICKWIRE SPENCER STEEL COMPANY

Copyright 1942, Wickwire Spencer Steel Co.



Weirton Steel



and *Minelayers*

To safeguard our coasts, Navy minelayers are continually ranging the shorelines and "planting minefields" to destroy Axis raiders. Steel to build more of these auxiliary ships is of crucial importance, and Weirton's mills are operating at full capacity to supply more steel.

Notwithstanding tremendous war-time demands, the quality of steel from Weirton is kept at peak by the "double-control" of expert craftsmen and superior machines. Thus today, as ever, the uniform high quality and dependability of Weirton steel continues to satisfy the requirements of the most exacting steel user.

WEIRTON STEEL COMPANY

Weirton, West Virginia

Sales Offices in Principal Cities

Division of

NATIONAL STEEL CORPORATION

Executive Offices · Pittsburgh, Pa.

HEAVY ROLLS EASILY HANDLED

at Atlas Steels Limited

Two three-ton hand-propelled Cleveland Tramrail Cranes with push-button-operated electric hoists serve the Roll-Turning Department of Atlas Steels Limited, Welland, Ontario.

Although some of the rolls weigh five or six tons it was felt to be more advantageous to have two three-ton cranes than one six-ton crane even though the two-crane set up was somewhat more costly to install.

When the five-or six-ton rolls are to be handled, the two cranes are used together each taking its half of the load. However, most rolls weigh three tons or less and are handled by either of the cranes. Thus, such size rolls can be placed in or removed from two lathes simultaneously.

The two-crane set up has proven extremely efficient to Atlas Steels. There rarely ever is any time lost waiting for crane service. Further it is easier to handle the big rolls with two cranes.

GET THIS BOOK!

BOOKLET No. 2008 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283rd ST. WICKLIFFE, OHIO.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

Cushioning Impact Loads on Roll Neck Bearings

THE "CORRECT" ANSWER TO ANOTHER TOUGH PROBLEM IN VITAL STEEL PRODUCTION:

Problem: This giant roller bearing helps roll out steel. Despite its size, it is made with watch-like accuracy and mirror-like finish. This type bearing is made for a definite period of useful life. But severe operating conditions —involving high pressures—will shorten that life unless a special grease is used to protect polished rollers and races.

Answer: *Gargoyle L Greases* have the extremely high load-carrying ability to protect the bearings from damage under high pressures. These special greases are also designed to stand up under constant churning and protect the mirror-like surfaces of rollers and races from pitting and consequent failure. They help assure dependable operation for the full span of the bearing's intended life.

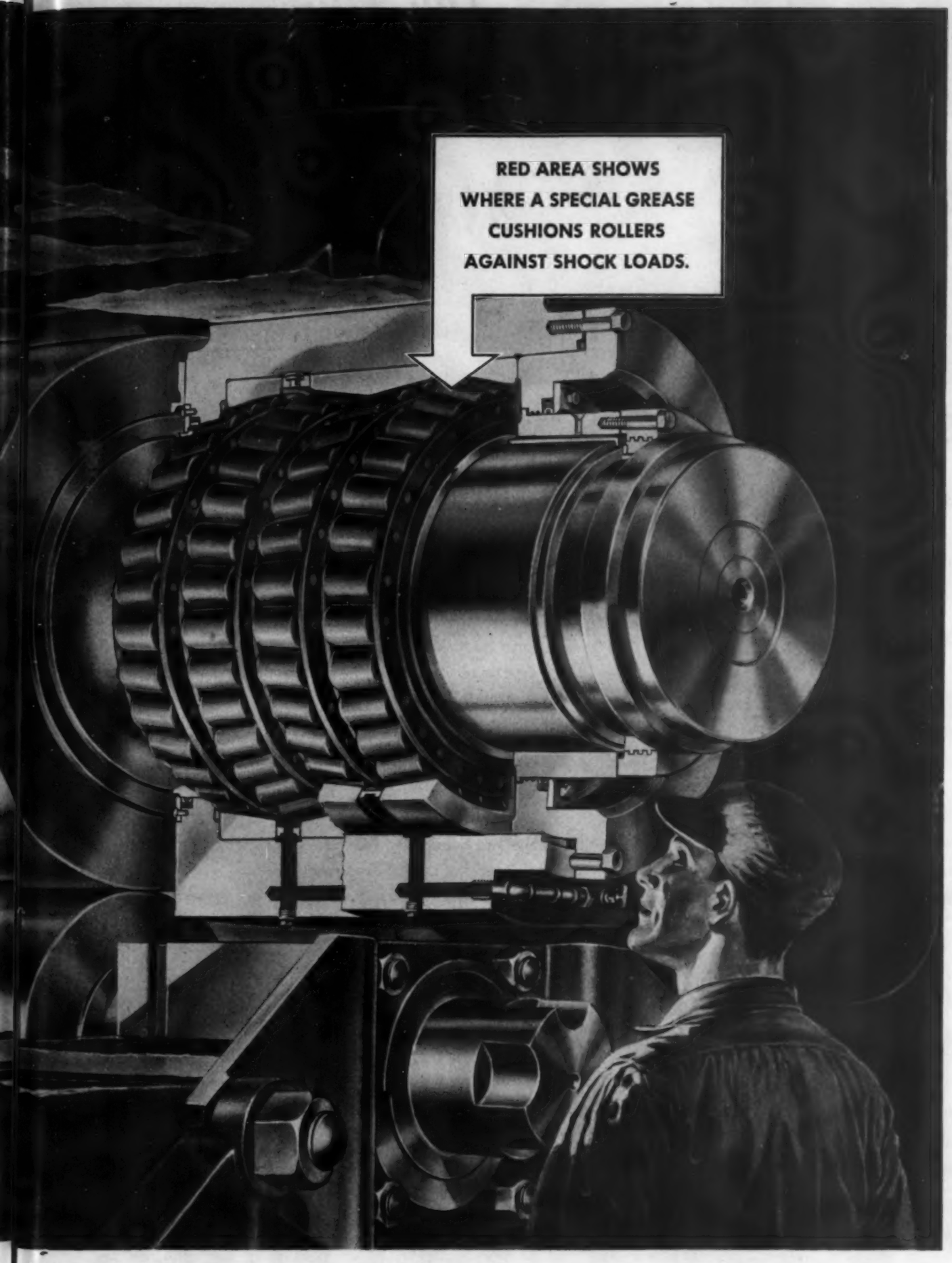
For circulation-oiled roll neck bearings, *Gargoyle Vacuoline Oils* give equally efficient service.

TO HELP MAINTAIN WARTIME PRODUCTION, CALL IN

SOCONY-VACUUM for "Correct Lubrication"

GARGOYLE Lubricants

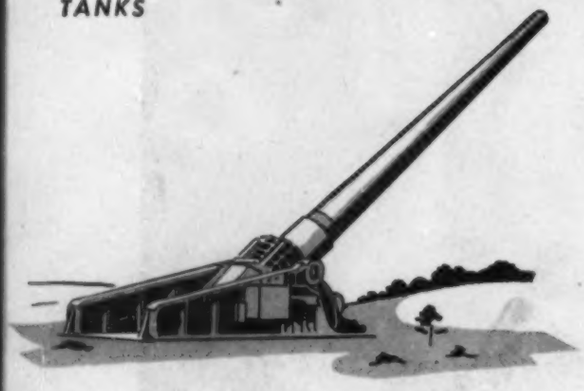
SOCONY-VACUUM OIL CO., INC. — Standard Oil of N. Y. Div. — White Star Div. Lubrite Div. — Chicago Div. — White Eagle Div. — Wadhams Div. — Southeastern Div. (Baltimore) — Magnolia Petroleum Company — General Petroleum Corporation of Calif.


RED AREA SHOWS
WHERE A SPECIAL GREASE
CUSHIONS ROLLERS
AGAINST SHOCK LOADS.

IF YOU FIND THAT *Steel Castings* ARE HARD TO GET...

PLANES

TANKS



GUNS

SHIPS

It is because they now have so many important war jobs to do—so many jobs that cannot be done so well or so quickly by any other method—or any other material.

In a wartime industry that must produce on a scale we've never dreamed of before, at speeds that set new records every day, Steel Castings are savers of time and labor.

They take less time to get ready to go—a pattern can be made faster.

They save machine work—because they can be produced close to final form and dimensions.

They save assembly time—by combining many parts in one.

They save labor, by requiring less handling of parts, less machining, less "cutting and fitting."

So it is not surprising that the Steel Foundries of America are today producing at *three times their prewar rate.*

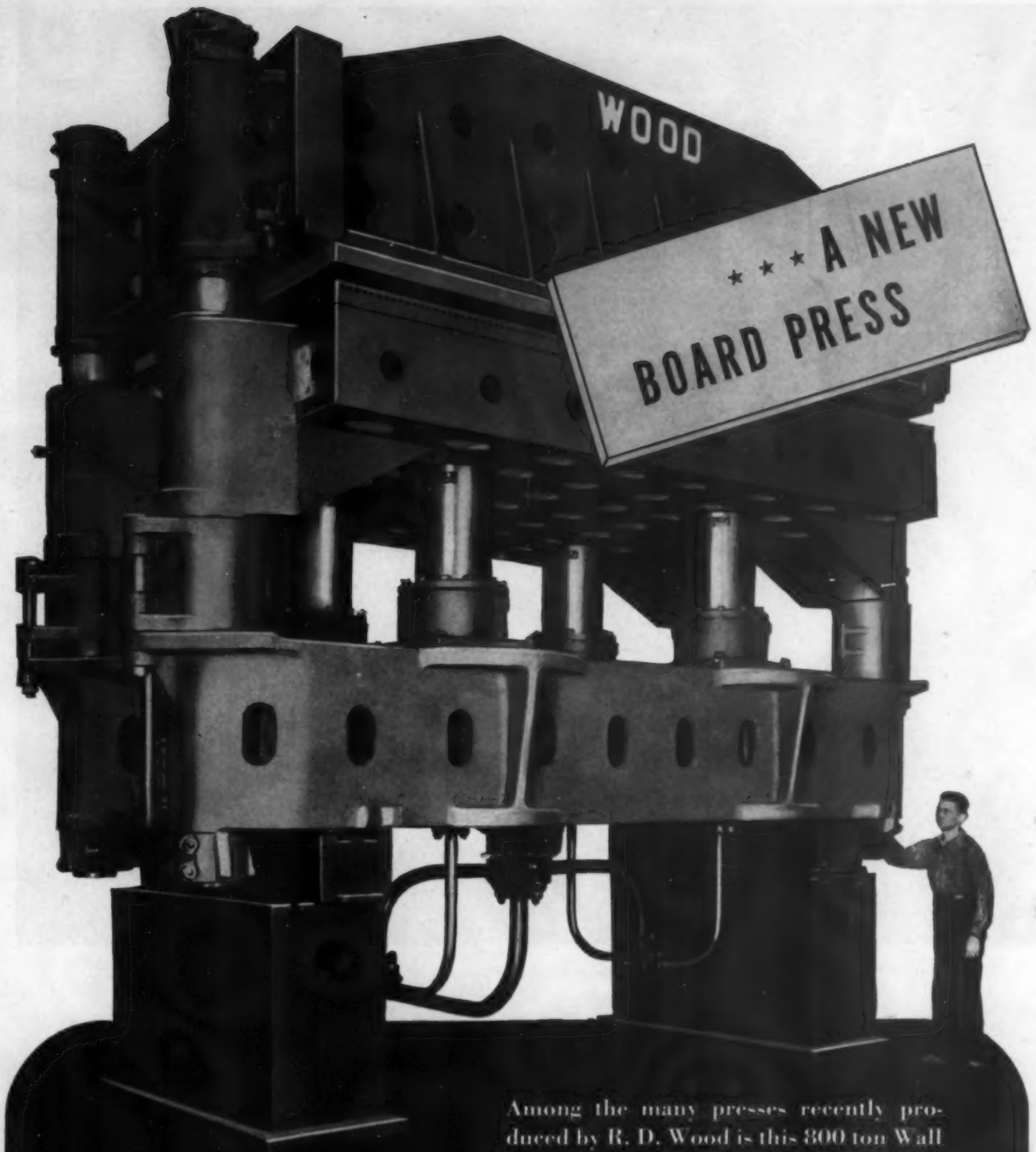
Someday—we hope it will be soon—the war will be over.

In the job that will follow, in again resuming peacetime production, the values that have made Steel Castings so essential in war will make their contributions to the great array of new things that will be built to maintain our American way of life as the best in the world.

Steel Founders' Society of America
Cleveland, Ohio

MODERNIZE AND IMPROVE YOUR PRODUCT WITH

STEEL CASTINGS

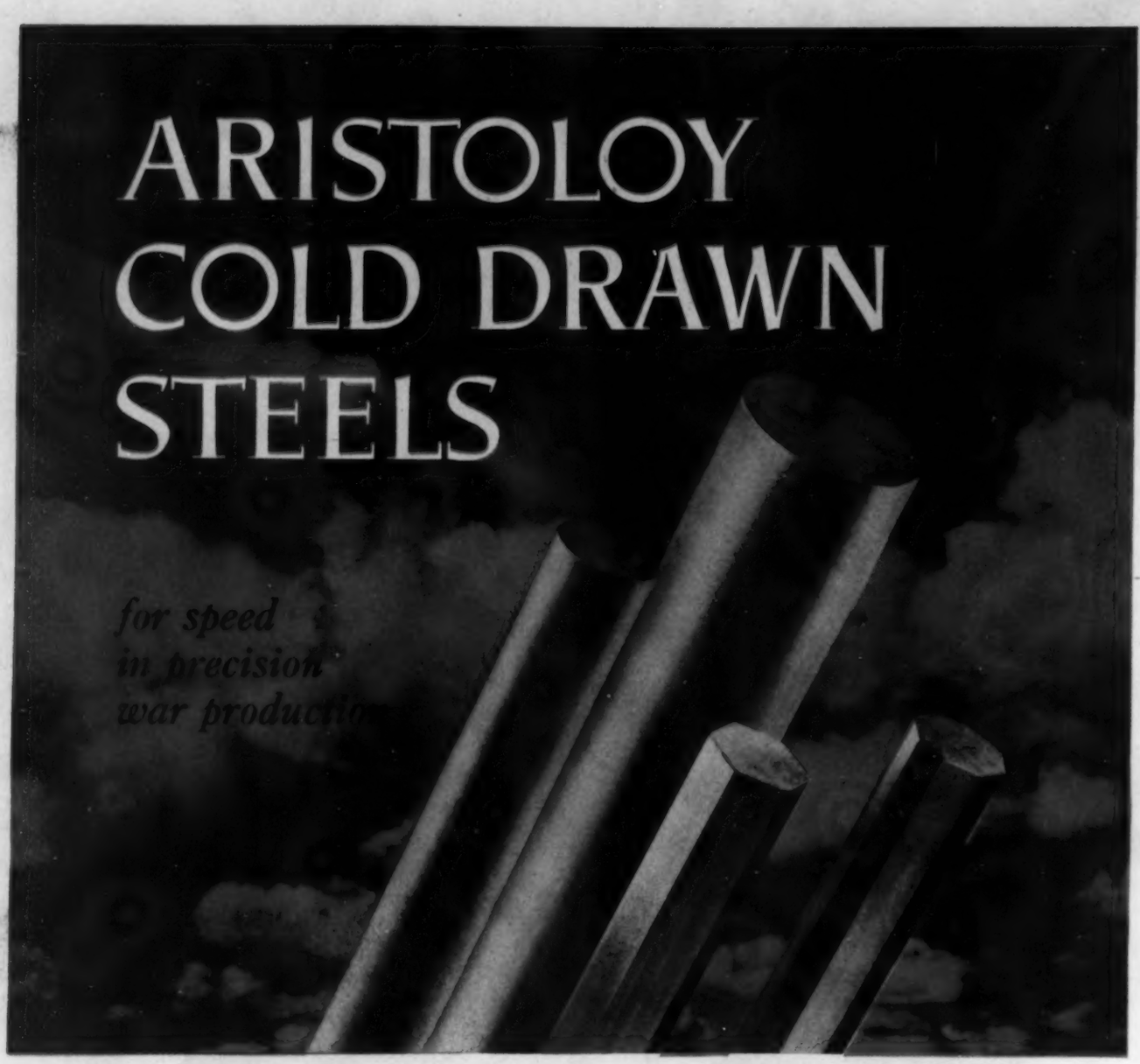


Among the many presses recently produced by R. D. Wood is this 300 ton Wall Board Press, platen size of 9′1″ x 13′10″, which is equipped with a bronze filter plate. This unit is one of numerous examples of how Wood engineers cooperate with every branch of industry in answering requirements for standard and special hydraulic presses and equipment.

HYDRAULIC PRESSES FOR EVERY PURPOSE

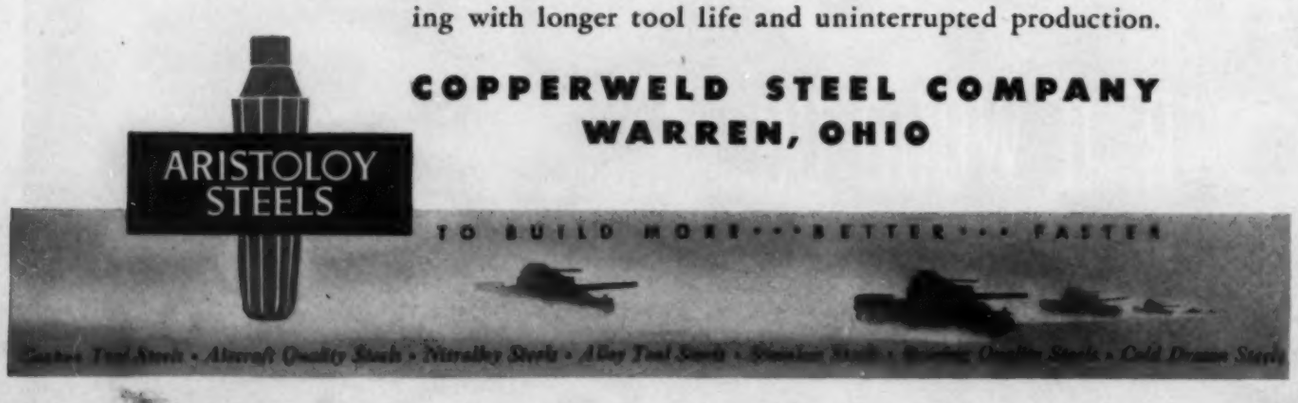
R. D. WOOD CO.

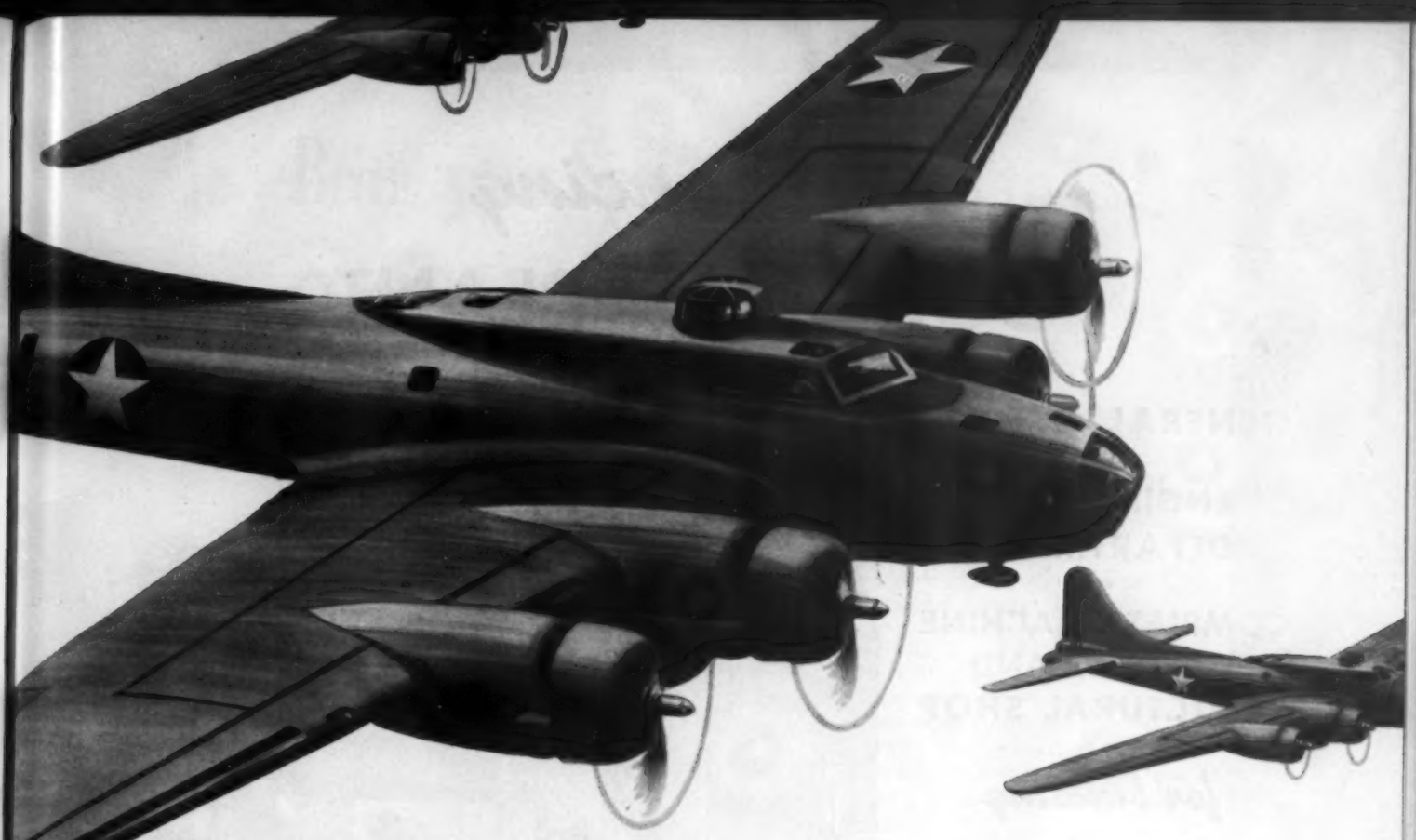
PHILADELPHIA · PENNSYLVANIA



Cold Drawn Steels have the vital wartime job of keeping fast automatic production machines operating continuously at peak loads. The uniform surface and close tolerance of Aristoloy Cold Drawn Steels assure smooth machining with longer tool life and uninterrupted production.

COPPERWELD STEEL COMPANY
WARREN, OHIO





An Answer from the skies

"NO FOREIGN power can ever harm Germany from the air" was the boast of Hitler's air marshal. Yet today American planes, piloted by American airmen, are flying far into middle Europe, carrying loads of destruction to the mighty industrial plants—the huge utility system—the network of transportation lines that are all so vital to the Third Reich's military power.

This sky-borne answer to Goering's boast is dramatic proof of the quality of American planes—and the American engines that power them.

For as the size of these planes and the size of the loads they must carry have gone up—and up—and up—the engines that power them have kept pace. Today, motors of 2000 h.p. and over are an accepted fact with engineers looking forward to greater and greater horsepower in the motors of tomorrow.

What this increased horsepower means to the gears that transmit engine revolutions to the whirling propellers can well be imagined.

For aircraft gears must be light in weight, yet the slightest inaccuracy in gears revolving at such high speeds transmitting such great horsepower would quickly spell failure. No wonder aircraft engineers long considered such high precision gears a laboratory product.

But an air armada of the magnitude we are launching demanded that gears be produced by the hundreds of thousands.

That this problem was successfully solved is evidenced by the gears—thousands upon thousands of them—being daily turned out by the Precision Gear Plant of Foote Bros.—gears produced on a schedule that spells doom for the Axis ambition of world conquest.

And when the war is won, these new techniques and new methods that have made extreme precision in mass production possible promise a new era in the design of high speed machines for a peacetime America.

FOOTE BROS. GEAR AND MACHINE CORPORATION
5301 S. Western Boulevard • Chicago, Illinois

FOOTE BROS.

Better Power Transmission Through Better Gears

Announcing
OUR NEW PLANT

GENERAL OFFICES
•
ENGINEERING DEPARTMENT
•
COMPLETE MACHINE WELDING AND STRUCTURAL SHOP
•
for building
MORE
HYDRO-ARC ELECTRIC FURNACES

OUR FORMULA

Experienced Engineering + Manufacture + Shop Assembly + Testing + SERVICE

EQUALS

Customers Satisfied with BETTER Electric Melting Furnaces

Come out and see us building Hydro-Arc Electric Furnaces. Look at our *accurate, fast, hydraulic controls* and *power operated electrode clamps*—fast—close control—keeps the men off the furnace.

HYDRO-ARC FURNACE CORPORATION

Telephones: La Grange 4545 and 4546
Chicago line: Enterprise 1068

561 Hillgrove Ave., La Grange, Ill.
(A suburb of Chicago, Ill., U. S. A.)

ASSOCIATED WITH WHITING CORPORATION

Bring your Spring Problems to us!

Here's expert help to speed up your war production

WAR is Hell—and no one knows it better than the design engineer called upon to furnish springs for modern fighting equipment.

Springs for such application must withstand stresses unheard of in peacetime. They must often fit niggardly limits of space and weight. They must function efficiently under incredible extremes of temperature, weather and atmosphere. And they must stand up in service on battlefields in every corner of the globe—on burning deserts, in steamy jungles, in the frozen spaces of the stratosphere, amid the salty spray of every sea.

These requirements impose problems the designer has seldom faced before. His job is made more difficult by the fact that shortages of critical alloying elements constantly tend to befuddle his choice of the proper steel for the purpose. That is why the help of our spring specialists can be so valuable right now.

These men, as recognized authorities in spring engineering, have collaborated in providing correct springs for every type of equipment America produces for war. Springs for tank and airplane cannon, for anti-aircraft guns, for projectiles, bombs, land mines, torpedoes, for precision instruments of all kinds. Their competent assistance is placed freely at your disposal. We welcome the opportunity to work with you.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

FIRST IN WAR...
FIRST IN PEACE...
U·S·S American Quality Springs

USS

UNITED STATES STEEL

THIS "OUNCE OF PREVENTION"

...weighed only 1/35,000 lb.!

YOU might never have noticed this slightly burnished spot where 1/5 grain of metal has been removed! But that makes it no less important. Accurately located, it corrects the balance of this super-charger impeller for one of Uncle Sam's fighting planes—to prevent vibration when it is "revved" up to such terrific speeds as 30,000 r.p.m. Without it, you'd have the throb of unbalanced forces, putting heavy strain on bearings, impairing efficiency, inviting trouble!

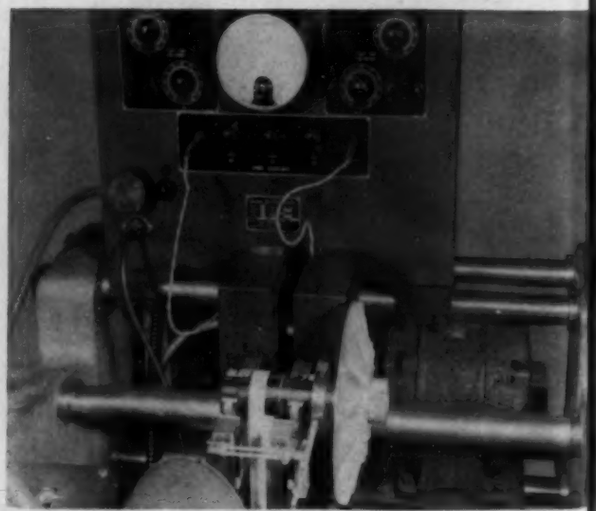
It is doubtful whether such a fine degree of static and dynamic balance could ever be attained without the aid of Gisholt Dynetric Balancing Machines. Certainly it could not otherwise be done so quickly and easily. For this machine, by picking up unbalance vibrations and electrically amplifying them 1,600,000 times, locates and measures them in a matter of seconds. It's the modern, low-cost way of assuring better performance and longer life in any high-speed rotating part.

GISHOLT MACHINE COMPANY
1217 Washington Ave. • Madison, Wis.

GISHOLT

The Army-Navy "E" has been awarded to Gisholt for highest service accomplishments in producing equipment vital to Victory.

ARMY E NAVY



DYNETRIC BALANCING MACHINES *are built in various sizes and types to balance any rotating part weighing from 1 oz. up to 50 tons. Literature will be sent on request.*

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

The Adaptability of HEVI DUTY Element Construction

HeviDuty Elements in Radiant Plates are readily adapted to box furnaces — cylindrical pit furnaces and special applications. In Hevi Duty Furnaces they are distributed to overcome unequal heat losses as at doors, rear walls, covers, etc. Engineering details on their construction and use are given in Bulletin H-D 740 — send for your copy.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

Use Your Oxy-Acetylene Cutting Blowpipes *to* HELP GET IN THE SCRAP!

To help bring in the large amounts of steel and iron scrap so essential to continued high levels of steel production, your oxy-acetylene cutting blowpipes can be used to good advantage. This is true because large tonnages of potential scrap are to be found in obsolete machines, structural shapes, pipe, old boilers, and other pieces too bulky or heavy to be moved conveniently. With oxy-acetylene cutting blowpipes, such material can quickly be cut up for easy handling and disposal. In addition, scrap that is cut to charging box size usually brings higher prices that will more than repay the cost of cutting up. Outlined here are some suggestions that may help you in making available the largest amount of scrap in the least time and with highest returns for your effort.

1. **Explore Your Plant and Property,** and appoint someone to ear-mark every piece of machinery and equipment that can be spared for scrap.
2. **Contact Your Local Scrap Dealer** or Salvage Committee and find out to what lengths the scrap should be cut for highest returns.
3. **Classify and Segregate** alloy steels and other special materials—including copper—whenever it is desirable. Make provisions for doing this during scrapping operations.*
4. **Centralize Your Scrapping Operations** as much as possible. This will speed up the work, will minimize lost motion and rehandling, and also will tie up less equipment and fewer oxygen and acetylene cylinders.
5. **Utilize Local Welding Shops** if you are not equipped to do your own oxy-acetylene cutting.
6. **Move Scrap Fast** when it is ready. Sell it to a scrap dealer—turn it over to your local salvage committee—or give it to a local charity. But get it in!

*To help you identify metals for efficient classification of your scrap, we will be glad to send you without charge as many copies as you need of the wall chart, "Identifying Metals by Spark Testing." *Ask for Form 4666.* Another useful chart that you can obtain from any Linde office is, "Simple Tests for Identifying Metals by Appearance, Chip Test, and Blowpipe Test." *Ask for Form 2299-D.*

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York, N. Y. UCC Offices in Other Principal Cities

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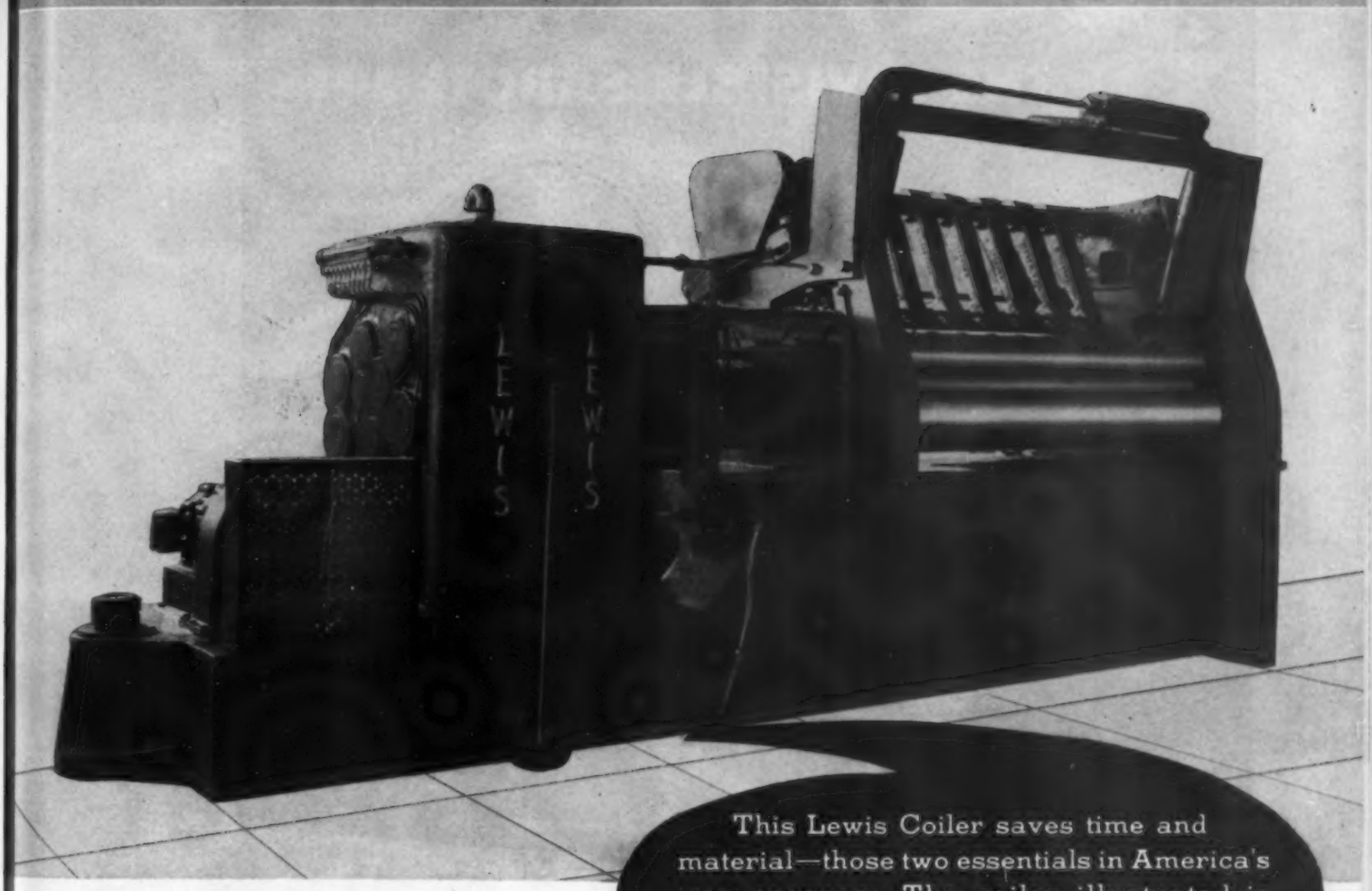
The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks.

New LEWIS Strip Coiler

ELIMINATES DANGER OF SCRATCHING



This Lewis Coiler saves time and material—those two essentials in America's war program. The coiler illustrated is being used to coil aluminum strip, which if scratched, is useless for many important purposes.

Features of the Lewis Three Roll Coiler:

Designed for coiling steel or non-ferrous strip up to 72" wide.

Coiler is equipped with guides, strippers and fibre lined pneumatic roller kick-off arms all especially designed to prevent scratching or other defacement of the material.

Steel forming and pinch rollers are hardened and ground. Top forming roller is equipped for individual or simultaneous adjustment on both sides through hand wheel and worm and worm gear. The machine is also equipped with side aligning rollers to keep the rotating coil straight at all times and has pneumatic simultaneous side adjustment through racks and pinions for widths from 24" to 72".

The machine is designed to swing in a semi-circle away from the mill or out of the strip line as may be required and is arranged with locking features to hold the unit in position. It can also be converted into a portable unit if desired.

LEWIS ROLLS step up tonnage

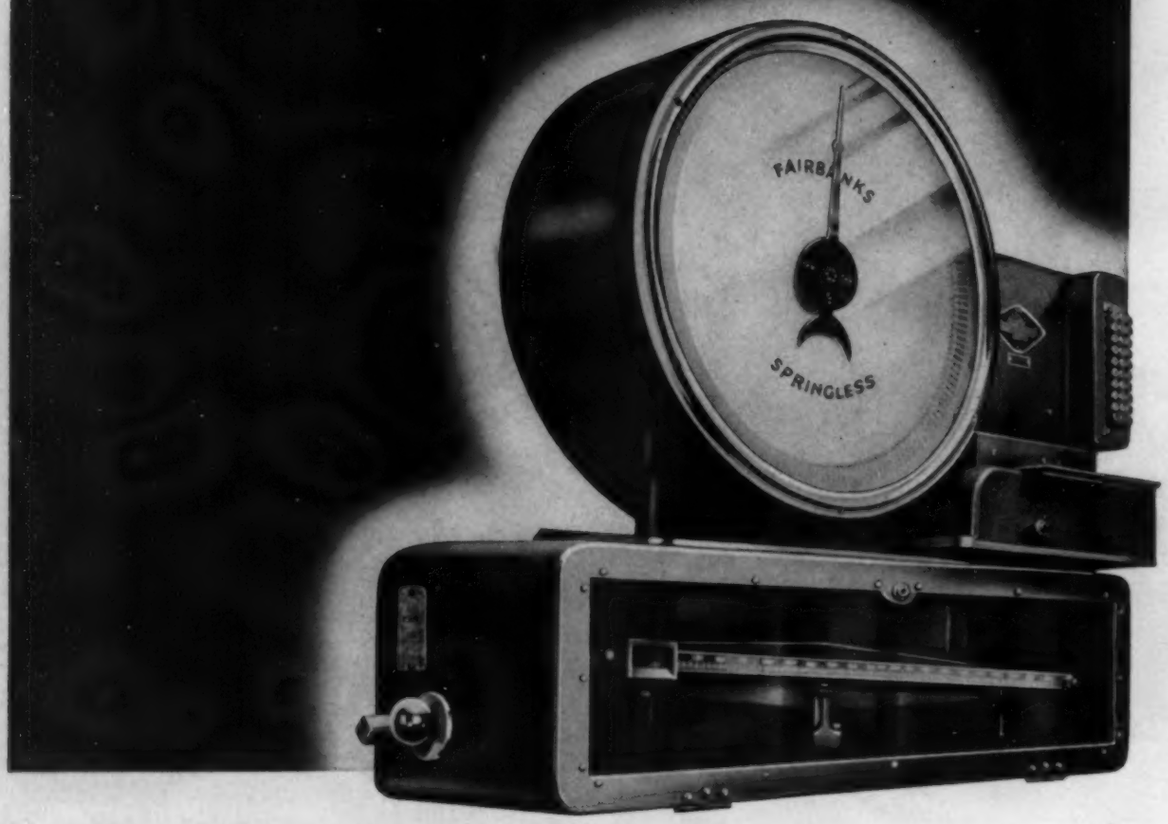
LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX CO.

PITTSBURGH, PA.

Blocking

THE INVISIBLE SABOTEUR!



ERRORS that could be prevented . . . operations that could be speeded up . . . methods that could be improved . . . all of these and others accomplish the ends of the saboteur even if they are unintentional.

Frequently engineers and executives are amazed by the timesaving applications that can be made with modern scales. For modern scales are *much more* than better weighing instruments. They count small parts. They weigh materials and commodities in motion. They read and keep books, making PRINTED RECORDS, much faster and with *unfailing accuracy* impossible for human eyes and hands.

Use your priority to get Fairbanks weighing equipment that will block the invisible saboteur in your plant, *now* — and make money for you in years to come. Fairbanks scale engineers are ready to help you. Fairbanks, Morse & Co., 600 S. Michigan Avenue, Chicago, Illinois.

FAIRBANKS-MORSE

SCALES
DIESELS
MOTORS
PUMPS

Lake freighters are again being built at Ashtabula, after a lapse of 25 years. *Page 78*

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Sure I'm busy... fighting a War!

"You know, a fellow standing here in my shoes gets a pretty good idea of what this U. S. A. can do when it starts rollin'. I run the flying shear on a four-strand Morgan Roughing Mill . . . Sure I'm busy, fighting a war! And we're going to win it, too! We've got the men and the machines, and the brains . . . LET'S USE 'EM!"

R-109

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS.

HIGHLIGHTING

this issue of STEEL

LABOR "Blueprints" which will enable industrial management to forecast their manpower problems and prospects with reasonable accuracy are contained in the manning tables (p. 46), soon to be placed in operation. These will provide information on which employes are likely to be inducted and offers a schedule for training of replacements. . . Shortages of workers now exist in 102 industrial areas, are anticipated in 77 others, while only 91 have surpluses (p. 68). . . Steelworkers now are earning 13 per cent more in direct wages per ton of steel produced than at this time last year (p. 69). This is due to last summer's wage increase and to more overtime. . . Time lost due to strikes dropped to the lowest level in five years (p. 68), according to National War Labor Board figures.

THEY SAID: Prime requisite for post-war prosperity is reform of those government policies which now depress business and discourage investment (p. 70), it was agreed at the War Congress of American Industry. Unnecessary concentration of industries was questioned by the manufacturers who held that "sacrifice is not an end in itself". . . "Fluidity of war"—swift changes in combat situations—was held responsible for the distress in those industries ordered to curtail armament schedules (p. 73); necessity for revisions was explained by the Army's chief of ordnance. . . Approaches to cost controls required by new and frequently altered production plans were discussed at the annual conference of the Society for Advancement of Management (p. 72). . . "We must shift the emphasis of national policy from waste and extravagance to economy and efficiency" if 1943 war production goals are to be achieved, warns E. L. Shaner (p. 45).

NEW PLANS WPB Steel Division last week was reorganized (p. 49) to enable it to handle increased responsibilities resulting from the Controlled Materials Plan. For complete official text of the plan see Section Two of this issue of STEEL. For sketch showing how the plan balances supply and demand see page 59. . . One step to help small businesses is a program to utilize their facilities (p. 59) to build special maintenance tools for combat vehicles. . . Ordnance officials are specifying a greater amount of steel in military equipment to conserve the relatively more scarce aluminum and copper (p. 52). No sacrifice in performance has resulted and in some applications improvement is noted. . . Builders' hardware lines (p. 53) are reduced to 3500 from 27,000 items in a drastic simplification program. . . Weeding out a mass of meaningless data, ambiguities and duplications in WPB request forms, the board's Committee for the Review of Data Requests from Industry has eliminated 120 forms and simplified 132 others, a 40 per cent reduction (p. 56).

EXPANSION United States Steel Corp.'s announcement that it is engaged in a $700,000,000 expansion program, (p. 60) was followed by a meeting of directors in Pittsburgh when it was disclosed $275,000,000 of that amount will be spent in that area (p. 52). . . Steel Institute reports that nearly $420,000,000 was spent by the steel industry in 1941 for repairs and maintenance (p. 53) . . . Construction of the government-financed detinning plant in Chicago is about to start (p. 60). . . Studebaker Corp.'s three plants this year will pour forth $215,000,000 worth of war equipment, double its entire volume of war production from 1852 to 1919, "and next year the figure may be tripled" (p. 63). . . Machine tool production in October reached an all-time high (p. 61) at 30,000 units. Builders' schedules will be rearranged to eliminate unevenness in backlogs.

TECHNICAL Construction of 621-foot bulk freighters for the Great Lakes at Ashtabula, O., is illustrated (p. 78). Gerald E. Stedman tells how use of the oxypropane cutting process has been expanded by war demands. It has been utilized in scrapping such heavy structures as old battleships (p. 80) as well as in foundry work.

George E. Stringfellow describes some of the materials handling facilities employed at the huge Allis-Chalmers plant in Milwaukee (p. 84). Herbert E. Fleming concludes his presentation on low-temperature brazing of tools at International Harvester's Tractor Works (p. 88) detailing the alloys and procedure employed.

The film-refining process—something new and original in steelmaking—offers the advantages of a fast and continuous method of making good clean steel and alloy steels of exact composition. At the same time it simplifies the steelmaking operation to make its control more certain and almost automatic (p. 92).

Thomas A. Frischman presents a metallurgical study of some NE steels with results of many tests on such types as NE-8620, NE-8720 and NE-8817. This is the fifth in the new series on reports of users of NE steels. For latest list of NE steels, see Nov. 23 issue, p. 96.

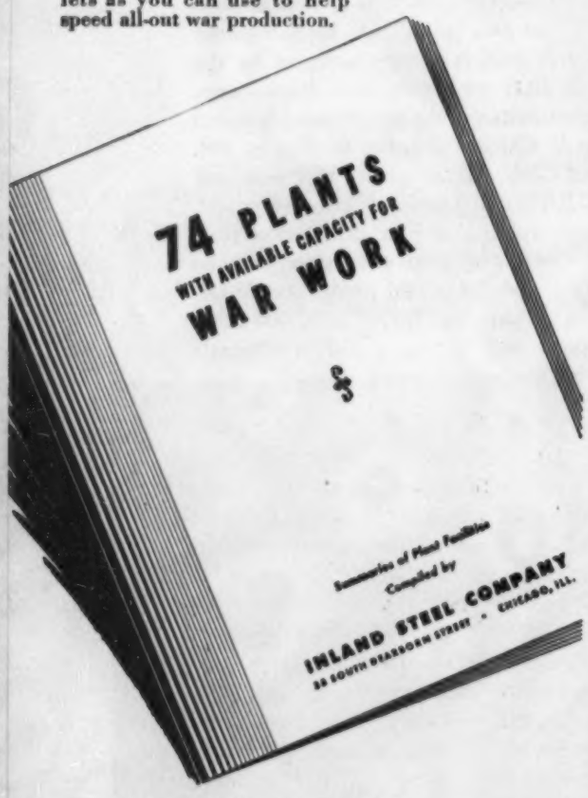
New Booklet
of Plants with Capacity for War Work

Many contracts have been placed as the result of recent Inland advertisements which list plants with machinery and men available to produce for war. *These listings are now ready in booklet form.* If you are looking for metal-working plants to handle war contracts or subcontracts you will find immediate use for this Inland booklet.

The companies listed have had their normal peacetime business suspended or greatly curtailed. They are successful companies that are ready and anxious to turn their equipment and trained men to war effort. Most of these companies are located in the Middle West; many are long established firms, known throughout the world, and with experience in war work.

The following new summaries are typical of the comprehensive method of listing in this helpful booklet.

Write, phone, or wire today for as many of these Inland booklets as you can use to help speed all-out war production.



Look over the facilities shown in the columns to the right. They are new—received after the Inland booklet went to press. Inland will gladly give you the names and addresses of any of the companies in which you are interested.

IS-86 Ill. mfr. of cans, specialties and pierced tin ware, 200 emp., 160,000 sq. ft. fl. sp., own loading platform. Served by 12 railroads. Equip. includes: 22 bumping horn presses, 3″ and 5″ dia., 8″ to 20″ length; gang slitters; square shears; tread rolling mach.; 8″ to 22″ swing, 24″ to 84″ bed lathes; 4 drill presses; surface grinder; 3 shapers; 2 milling machines; spray booths; can line for 2½″ x 2″ up to 19″ x 29″ cans; and, 68 power presses for forming and drawing 0.010″ to 0.105″ metal. Has performed on contracts for Army and Navy.

IS-87 Ill. steel fabricator is ready to take on structural work. Have facilities for cutting bars, beams and angles squarely and accurately to size. Also for punching, riveting or welding. Carry a limited stock of angles, channels and beams available for quick delivery on fabricating orders with high priority ratings.

IS-88 Mo. mfr. of electrical devices desires subcontracts. Has 28 punch presses, 6 drill presses, 9 riveting machines, 3 welders, 5 tapping machines, 8 auto. coil winders, 42″ power shears, 8′ brake, good electrical research laboratory, adequate tool room. Established 18 yrs. 18,000 sq. ft. space.

IS-89 Wis. hvy. steel plate fabr.; over 50 yr. in business; 26,000 sq. ft. fl. sp.; 35,000 sq. ft. yard area; R. R. enters shop; 15-t. main crane 60 ft. span; precision flame cutting; 3 plate rolls #10 ga. to 1½″; apron brake 12 ft.; sq. shear ⅜″ x 10 ft.; throatless shear ¾″ cap.; large punch 5 ft. throat; comb. punch & shear; horizontal drill 5 ft. radius; 10 welding machines; bar & angle rolls; riveting presses; 6 x 6 high speed hack saw; air grinding & polishing; paint spray; assembling; maintenance mach. shop; engr. staff; financially able. Production or jobbing work wanted.

IS-90 Ill. furnace & air conditioning mfr.; pl. fl. sp. over 105,000 sq. ft.; emp. 150; has two R. R. sidings. Equip. incl. shearing, blanking, drawing, pressing, bending, punching, riveting, welding and surface grinding. Sheet steel working up to ¼″ & hvr. Comp. cap. for war work contracts.

IS-91 Minn. mfr. of furnaces, heaters, and air conditioners, emp. 100. Has had experience with war production. Factory sp. 75,000 sq. ft. on own R. R. siding. Complete sheet metal production equip., including punch presses, power brakes, folders, shears, crimper; welding, painting and finishing equip.; mounting dept. Machine shop, including lathes, grinders, drill presses, saws, milling machines and shaper.

IS-92 Nationally known Ind. farm mchry. mfr. with capable engr. staff and 250 emp., modern plant —over 100,000 sq. ft. fl. sp., with additional 70,000 sq. ft. for whse. storage. Large machine shop with sheet metal and wood working depts., tool room, assembly, painting and shipping, gray iron foundry available.

IS-93 Wis. fab. of struc. steel and plate work. Desires war work, begin at once. 30,000 sq. ft. fab. shop, blacksmith shop, templet shop with facilities for punching, shearing, forming, bending, riveting, electric welding and acetylene cutting equip. 32 yr. expr. in light, heavy riveted and welded structures and plate work.

IS-94 Pa. gear and mach. mfr. has available capacity on 54″ bevel gear planer and rougher. Have been cutting large bevel gear rings for Army.

IS-95 Ohio mfr. with facilities for iron, steel and wire fabrications desires war subcontract work. 350,000 sq. ft. sp., two R. R. sidings; 56 yrs. exp. Financial stability (highest commercial rating obtainable). Primarily interested in units or parts of units fabricated from angles, flats, tees, rounds, squares, sheets, strips, plates, etc. Equip. incl.: punch presses, power brakes, shears, spot and arc welders, drill presses, bull dozers, auto. saws, heat treating furnaces, tool room equip., etc.

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

STEEL
December 14, 1942

Lost: The Habit of Efficiency!

While this is no time for blind optimism or complacency, one cannot help but be encouraged by the OWI report on war production, issued on the eve of the first anniversary of Pearl Harbor. That in the year 1942 "we shall have produced approximately 49,000 planes, 32,000 tanks and self-propelled artillery, 17,000 anti-aircraft guns larger than 20 mm. and 8,200,000 tons of merchant shipping" is a noteworthy achievement, measured by any yardstick.

It is even more impressive when we take into account the fact that this production was accomplished at a time when a substantial portion of our effort was being directed toward plant conversion, expansion and other phases of the tooling-up process. As the problem of preparation diminishes and as the proportion of attention to smooth-running, big-scale production mounts, the nation's output of war goods should increase appreciably.

But it will not increase as much as it should unless everybody concerned with production snaps into a more realistic attitude toward efficiency and economy. Perhaps it has been necessary in some instances to sacrifice these virtues in order to get a quick start. Admittedly war imposes many conditions which make peacetime standards of efficiency difficult of attainment.

Nevertheless, we must get back into the habit of efficiency. We must shift the emphasis of national policy from waste and extravagance to efficiency and economy. It is downright foolishness to be pouring so much time, effort and money into the war program at the top when so much of it is leaking out at the bottom through sheer inefficiency.

The incentives for efficiency and economy should be self-evident to everybody. Right now the incentive is victory. The more efficient we are, the quicker the war will be won. After we have won the war, the incentive will be the establishing of a durable peace and a satisfactory postwar economy.

Efficiency—so sorely neglected these many recent years—is the most potent means to these two ends.

E. L. Shaner

Editor-in-Chief

Give Employers "Blueprint" For Solving Draft Problems

Orderly plan for anticipating manpower losses and training replacements for potential inductees provided. Management to analyze jobs as to essentiality in war production

"BLUEPRINTS" by which management of war industries can plan and work out their prime manpower problems in co-operation with the War Manpower Commission and the Selective Service soon will be made available by the WMC.

The blueprints are the manning tables, full details on the operation of which have just been announced. They offer a fairly definite means to chart which employes will be subject to military induction and offer a schedule for training replacements.

Copies of the tables soon will be distributed by regional WMC offices to employers whose plants are 75 per cent or more engaged in war production or who are performing some essential service, such as the railroads, public utilities, and similar jobs.

The manning tables are forms, which, when filled out, provide a realistic inventory of the personnel and job classifications in each plant. They determine how efficiently a plant is utilizing its working force, how adequate are its programs for training, upgrading and promoting employes, and provide a basis for planning improvements. They will provide each employer with complete information as to the number of employes who are subject to induction. A supplementary withdrawal and replacement schedule will offer him guidance in planning replacements so that his production will not suffer as his employes enter military service.

The manning table forms are relatively simple to fill out, and they offer a sensible method of evaluating the personnel and production problems of each plant and the best method of meeting them.

The employer must expend some time and effort in gathering the required information, but will in return receive information which will enable him to plan adequately to meet his labor needs of the future. The government will, in turn, receive information which will furnish the basis for the orderly withdrawal of workers, who must, under Selective Service, be released to the armed services.

The manning tables are one part of a four-part plan by which the War Manpower Commission and Selective Service intend to meet the withdrawal of inductees from industry through the planned training of replacements in a manner which will keep disruption of production at an absolute minimum. The other parts are:

1. The drawing up of a list of 35 industries designated as "essential activities," which are as follows:

Production of aircraft and parts.
Production of ships, boats and parts.
Production of ordnance and accessories.
Production of ammunition.
Agriculture.
Processing of food.
Forestry, logging and lumbering.
Construction.
Coal mining.
Metal mining.
Nonmetallic mining and processing and quarrying.
Smelting, refining, and rolling of metals.
Production of metal shapes and forgings.
Finishing of metal products.
Production of industrial and agricultural equipment.
Production of machinery.
Production of chemicals and allied products.
Production of rubber products.
Production of leather products.
Production of textiles.
Production of apparel.
Production of stone, clay and glass products.
Production of petroleum, natural gas and petroleum and coal products.
Production of finished lumber products.
Production of transportation equipment.

Replacement of personnel has become one of war industry's major problems. How the aircraft industry is meeting it is depicted in this photo at a Douglas Aircraft Co. plant. It shows a typical group of new employes. Of Douglas personnel, more than one-third are women; among new employes, women outnumber men three to one

REPLACEMENT SUMMARY

EXAMPLE A. List of Jobs - Selective Service Status of Workers

Line No. or Code	LIST OF JOBS (Job Titles)	Number of Women	Number of Men not now to be considered for Replacement on Example - B: Men with Minor Children	Class 4-F	Over Age	Under Age	Total	Number of Men to be considered for Replacement on Example - B: Single Men	Married Men without Children	Total	Total of all Workers	Anticipated Maximum Number of Workers (Optional)
1	2	3	4	5	6	7	8	9	10	11	12	13
	DETAIL MFG. DEPT.											
	MACHINE SHOP											
	Foreman		5		2		7		1	1	8	
	Sub-Foreman		6	1	3		10	2	3	5	15	
	Leadman		19	1	9		29	6	2	8	37	
	Milling Mach. Opr.		20	2	15		37	10	11	21	58	
	Automatic Screw Mach. Opr.		10	2	6	1	19	8	21	29	48	
	Engine Lathe Opr.		7	3	7	3	20	27	11	38	58	
	Drill Press Opr.	42	20	5	10	61	138	32	41	73	211	
	Assembler "C"	824	550	69	179	231	1,853	237	294	531	2,384	
	ENGINEERING DEPT.											
	Chief Engineer				1		1				1	
	Administrative Engineer		1				1				1	
	Project Engineer		3		1		4		1	1	5	
	Layout Draftsman		16	2	12		30	8	14	22	52	
	Detail Draftsman	38	15	11	21	13	98	61	41	102	200	
	Expediter		3	1			4	1	1	2	6	
	Stock Clerk		4	1		1	6	3	5	8	14	
	Stock Chaser		4	1		3	8	11	8	19	27	
	TOTALS	4,515	3,403	422	1,797	1,290	11,427	1,643	1,772	3,501	14,928	

EXAMPLE B. REPLACEMENT LIST

Line No. or Code	Job Title	Name	Year of Birth	Sel. Ser. Class	Married or Single	Local Board No. County State	Order No. (opt)	We will be prepared to replace these men within the month or period checked below. 1st	2nd	3rd	4th	5th	6th	6 to 12 Mos.	Over 12 Mos.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	DETAIL MFG. DEPT.														
	MACHINE SHOP														
1	Foreman	Smith, John R.	'04	II-B	M	-									✓
2	Sub-Foreman	Jones, Thomas L.	'09	III-B	S	-				✓					
3		Wilson, Jeffry R	'12	III-A	S	-					✓				
4		Bradon, John R.	'11	II-B	S	-						✓			
5		Waite, Tim	'17	II-B	M	-							✓		
6		Mann, Joseph W.	'17	II-B	M	-								✓	
7	Leadman	Nichols, Roger	'15	III-A	S	-		✓							
1463		Colgan, Douglas	'22	Uncl.	M	-							✓		
	ENGINEERING DEPT.														
1464	Project Engr.	Evans, John T.	'99	III-B	M	-									✓
1465		Allan, B. C.	'07	II-B	S	-			✓						
1466	Layout Draftsman	Martin, Chas.	'09	II-B	S	-			✓						
1467		Park, Franklin	'09	III-A	M	-				✓					
1468		Davis, Donald K.	'14	II-B	M	-				✓					
3499	Expediter	Furman, Oliver S.	'14	II-B	S	-					✓				
3500		Winter, Wm. C.	'17	III-A	M	-								✓	
3501	Stock Clerk	Honan, W. H.	'21	I-A	S	-		✓							
		TOTALS						167	100	100	100	150	150	1250	1484

Two of the forms employers will be asked to fill in by the War Manpower Commission. The Replacement Summary analyzes the employment force as to liability to the draft and as to jobs. The Replacement List inventories men to be replaced

Transportation services.
Production of materials for packing and shipping products.
Production of communication equipment.
Communication services.
Heating power and illuminating services.
Repair services.
Health and welfare services.
Educational services.
Governmental services (other than federal).
Technical, scientific and management services.

2. Preparation of a list of the essential jobs—approximately one out of each nine—within each of these industries. This list should be completed by Dec. 31, and will include 3000 classifications.

3. Preparation of withdrawal and replacement schedules to be based on information compiled in the manning tables. Where plants are facing a critical situation requiring immediate attention, these schedules may be prepared and put into effect before the manning tables.

The four parts fit together neatly. The lists of essential industries and jobs aid local Selective Service boards in determining which jobs shall be reason for

deferment. The lists are elastic and can be lengthened or shortened as circumstances dictate.

The first step taken was to determine which industries were essential to the nation's war effort. This done, the War Manpower Commission studied the jobs within each industry and separated the essential ones from the others by applying the following three questions as a test:

1. Is a training period of at least six months necessary before an untrained worker can attain reasonable efficiency in the job?
2. Is the job essential to the industry?
3. Is the worker irreplaceable?

The job was rated essential if a "yes" answer was given to all three questions.

The local Selective Service boards can use these lists to check against any request by an employer for deferment of a worker whom the employer declares to be essential, pending completion of the withdrawal and replacement schedules.

Such deferments, usually granted for a six months period, do not mean exemption from the draft. Such workers, if fit for military service, are granted deferment only long enough to enable their employers to train someone to replace them.

In the past, however, replacements have been more the exception than the rule. Employers have not trained replacements in an adequate fashion and have had no way of knowing how rapidly men would be taken. Some have even made the mistake of training replacements who were themselves subject to induction.

Local boards are accustomed to dealing with each case as an individual. There have been cases when local boards, each unaware of what the other was doing, took so many men from a single department of a plant at the same period that production was disrupted. It has been obvious that some more co-ordinated method was needed for planning both withdrawals and replacements. To meet this need, the manning tables and the replacement schedules were worked out.

Other Information Asked

In addition to the usual routine information, these manning tables ask each employer to provide the following information:

1. The different kinds of jobs in the plant or activity.
2. The number of workers necessary to do each kind of job.
3. The type of worker suited to do each job and the possibility of substituting other workers of less skill.
4. The amount and kind of training needed to train an unskilled worker to do each job.
5. Training methods being used or available.
6. The jobs in which women are employed and those in which women could replace men.
7. Indications of labor requirements that will accompany anticipated production program.
8. Job relationships, and possibilities for promotions and upgrading.
9. Balance or unbalance between number of skilled workers and unskilled, or of workers and supervisors.
10. Jobs where physically handicapped persons can be used.

The company retains one copy of the complete table and sends four to the WMC regional office. The regional office keeps one and sends a copy each to the state director of Selective Service, the War Manpower Commission in Washington, and the local director of the United States Employment Service.

After drafting the manning table, the employer will draw up a replacement schedule to direct him in upgrading, promoting and recruiting replacements for workers which the compiled information shows him will soon be inducted. When the replacement schedule has been accepted by the state director of Selective Service, the employer will be authorized to use a state acceptance number on forms 42-A filed in accordance with the accepted replacement schedule. The employer will fill out an affidavit—Occupational Classification Form 42-A—for all employes within the ages liable to military service for whom occupational deferment is then necessary.

WMC To Assist Employers

It will not be necessary at the present time for employers to file such affidavits for employes who have wives and children with whom they maintain a bona fide family relationship. The employer will, however, file a Form 42-B for such employes.

These forms 42-A and 42-B are then forwarded to the local Selective Service boards concerned. When the employe is classified or reclassified, the local board will notify the employer.

This system will enable each employer to know not only how many employes will be withdrawn from each department of his plant but will know approximately when the withdrawal of a worker will occur and will be able to plan his replacements accordingly. The War Manpower Commission will assist the employer in every way it can to make such replacement and will advise him and aid him in locating women, older workers and handicapped workers.

Once the manning tables and replacement schedules are in operation, deferment of workers will be subject to periodical review.

The policy behind the manning table is explained by Paul V. McNutt, chairman of the War Manpower Commission. "In total war," Mr. McNutt said, "each

(*Please turn to Page* 144)

Ten grimy women in overalls, slacks, or a pair of their husband's old pants march to their lockers at the yards of the Long Island railroad, Jamaica, N. Y., after a busy day cleaning locomotives. A crew of 28 can clean as many as 58 engines by dipping a wad of waste into locomotive oil and rubbing hard. Their work is praised by enginemen and inspectors. NEA photo

New Setup Expected To Facilitate Effective Administration of CMP

Twelve main operating branches provided, with four assistant division directors. Labor and industry committees important part of organization

REALIGNMENT of WPB's Steel Division into 12 main operating branches, supervised by four assistant division directors, was announced last week by H. G. Batcheller.

At the same time, Mr. Batcheller announced full composition of the Steel Products Industry Advisory Committee and various individual product groups which work with the overall Iron and Steel Industry Advisory Committee.

"This new organization will enable the Steel Division to handle increased responsibilities placed upon it as a result of the Controlled Materials Plan", Mr. Batcheller said.

"The industry and labor committees are an important part of this organization, and we are counting on them to give us the benefit of their wide experience in the many phases of the production and fabrication of steel."

Office of the division director includes Alexander C. Brown, vice president, Cleveland-Cliffs Iron Co., as deputy director, and the following special assistants to director, as announced:

Clark King, research engineer, Bethlehem Steel Co.; Julius Clauss, chief engineer, Great Lakes Steel Corp.; A. Oram Fulton, president, Wheelock-Lovejoy & Co.; C. S. Long, president, Sterry Block Co.; and Harold J. Ruttenberg, research director, United Steelworkers of America, CIO.

Production Directive Unit

Production directive committee is as follows:

Joseph L. Block, vice president, Inland Steel Co., chairman; Charles A. Halcomb, Procter & Gamble Co.; J. V. Honeycutt, Bethlehem Steel Co.; C. H. Longfield, Youngstown Sheet & Tube Co.; E. L. Parker, Columbia Steel & Shafting Co.; and A. V. Wiebel, United States Steel Corp.; Harold J. Ruttenberg; and R. W. Shannon, secretary.

Assistant division directors, chiefs of operating branches, and functions are:

Assistant director for raw materials and facilities: Frank Vigor, general transportation manager, Ashland Division, American Rolling Mill Co.; Facilities Branch, headed by Edwin H. Brown, vice president, Allis-Chalmers Mfg. Corp., responsible for planning construction, operation, repair and maintenance; Metallurgical and Technical Branch, headed by H. J. French, president, American Society for Metals, responsible for conservation specifications and substitution; Raw Materials Branch, W. C. Kerber, responsible for ore, pig iron, scrap, refractories and fluxes and fuel.

Assistant director for production: David Austin, former acting chief of the Iron and Steel Branch, and vice president, Carnegie-Illinois Steel Corp.; Alloy Steel Branch, headed by W. J. Priestly, vice president, Electro Metallurgical Co., responsible for construction alloys, stainless steels, tool steels; Heavy Products Branch, headed by J. V. Honeycutt, responsible for plates and shapes, rails, forgings and castings, and wire products; Bar Sheet and Strip Branch, headed by G. S. Gries, vice president, Great Lakes Steel Corp., responsible for hot-rolled, semifinished, and cold-rolled bars, sheets and strip; Tubular and Tin Plate Branch, headed by C. H. Longfield, responsible for pipe, tubing, and tin plate.

Assistant director for program and distribution: N. W. Foy, general manager of sales, Republic Steel Corp.; Program Distribution Control Branch, chief unnamed, responsible for requirements, records, and statistics, priorities and allocations and supply; Export Branch, headed by P. F. Schucker, responsible for all steel exports; Steel Recovery Branch, headed by C. V. Bradley, president, W. J. Holliday Co., responsible for sales, distribution and allocations, (located in Pittsburgh); Warehouse Branch, headed by J. R. Stuart, formerly of C. F. Hutton & Co., responsible for warehouses and merchant products.

Assistant director for ferroalloys: Miles K. Smith, former chief of the Ferroalloys Branch, and chief metallurgist, Latrobe Electric Steel Co.; Ferroalloys Branch, headed by Andrew Leigh, formerly deputy chief of the Manganese Branch, responsible for tungsten, vanadium, molybdenum, cobalt, manganese, chromium, nickel, matte ore and other alloying metals and ores.

General steel products industry advisory committee, which works with overall advisory group, is as follows:

Avery Adams, vice president, United States Steel Corp., Pittsburgh, carbon steel bars and semifinished steel.

R. M. Allen, general manager of sales, Allegheny Ludlum Steel Corp., stainless steel.

N. J. Clarke, vice president, Republic Steel Corp., Cleveland, alloy steel.

J. A. Henry, vice president in charge of sales, Weirton Steel Co., Pittsburgh, tin plate.

Paul Mackall, vice president, Bethlehem Steel Co., Bethlehem, Pa., shapes and plates.

John Neudorfer, vice president in charge of sales, Wheeling Steel Corp., Wheeling, W. Va., wire products.

L. M. Parsons, vice president in charge of sales, Jones & Laughlin Steel Corp., Pittsburgh, cold-finished bars.

W. W. Sebald, vice president and assistant general manager, American Rolling Mill Co., Chicago, sheets and strip.

E. W. Watson, vice president in charge of sales, Youngstown Sheet & Tube Co., Youngstown, O., pipe.

J. H. Parker, vice president, Carpenter Steel Co., St. Louis, tool steel.

Isaac Harter, executive vice president, Babcock & Wilcox Tube Co., Barberton, O., tubing.

A. C. Roeth, vice president, Inland Steel Co., Chicago, rails and track accessories.

Individual products advisory committees have been reorganized.

Single Nonferrous Metals Branch Set Up by OPA

Consolidation of two branches of OPA's Industrial Materials Price Division to form a single Nonferrous Metals Branch has been effected.

The new branch, headed by John D. Sumner as price executive, incorporates the previously existing Copper, Aluminum and Ferroalloys Branch and the Zinc, Lead and Tin Branch.

Associated with Mr. Sumner in a staff capacity are E. S. Glines and Karl Anderson.

N. H. McDiarmid, principal administrative officer of the Zinc, Lead and Tin Branch, will serve the new branch in the same capacity.

Carl Holmquist, price executive of the Copper, Aluminum and Ferroalloys Branch, has resumed his former connection with Sanderson and Porter, New York industrial engineers.

The Nonferrous Metals Branch has five active operating sections, as follows: Basic Metals and Mining, O. C. Lockhard, head; Ferroalloys, Donald Van Deusen, head; Minerals and Minor Metals, Philip Woolfson, head; Scrap and Secondary Metals, Thomas McManus, head; Fabricated and Manufactured Products, Orrin McCorison, head.

November Ingot Total Best for 30-Day Period

Month's output of 7,184,560 tons drops slightly under record made in October

PRODUCTION of 7,184,560 net tons of steel ingots and castings in November was the largest ever achieved in a 30-day month, according to the American Iron and Steel Institute. The November total was less than the peak production of 7,584,864 tons in October, but was greater than the 6,960,885 tons made in November, 1941.

In November steel production averaged 97.9 per cent of capacity, against the peak rate of 100.1 per cent in October. In November, 1941, production was at 98.2 per cent of a capacity which was considerably less than at present.

An average of 1,674,723 tons per week was produced in November, compared with 1,712,159 tons in October and 1,622,584 tons per week in November, 1941.

Coke, By-Products at Alltime Peak; Increases Planned for '43

Output of coke and its chemical by-products has been increased to a new all-time record and production still is being expanded.

Approximately 1.4 tons of coal is required to make enough coke to produce a ton of steel. In making coke, many vital chemicals are obtained as by-products, which are used in making such essential war and civilian goods as explosives, artificial rubber, artificial silk ("nylon") and medicines, including the "sulfa" drugs which saved so many lives at Pearl Harbor.

October coke production, estimated at 6,046,394 tons, exceeded the August output, the previous record high month, by 49,324 tons.

The total 1942 output up to Oct. 31 is estimated at 58,551,000 tons. The output rate indicated that the previously estimated production of 70,000,000 tons in 1942—a new high record—probably will be exceeded. The production of coke by-products showed similar increases.

The supply of the particular grades and kinds of coals used in coke manufacture is limited, and steps are being taken to assure the future adequacy of these coals, according to Solid Fuels Co-ordinator Harold L. Ickes. Although emergency action by the Solid Fuels Office has been necessary on several occasions in recent months to keep "by-product" coal rolling to by-product coke plants in adequate quantity, no plant has yet reported curtailed operations for lack of coal. These particular emergencies occurred when manpower losses at the mines made it impossible for the coal producers to supply tonnages required by contracts with the coke plants.

Next year's anticipated coke production requirements have been estimated at 75,500,000 tons, and coal requirements of the coke industry will be about 112,000,000 tons. This represents an increase of about 12,000,000 tons of by-product coals over 1942. Altogether, it is anticipated that the iron and steel industry will consume a grand total of 126,000,000 tons of bituminous coal for all purposes in 1943.

Lukens Increases Output 40.8 Per Cent Above 1941

Lukens Steel Co., Coatesville, Pa., during its fiscal year ending Oct. 10, set an all-time production record 40.8 per cent higher than in its 1941 fiscal year, which also was an all-time mark. This figure does not include operations by the company's two subsidiaries, By-Products Steel Corp. and Lukenweld Inc., both of which also established new high records in fabrication of war mate-

STEEL INGOT STATISTICS

	Estimated Production—All Companies								Calculated weekly production, all companies Net tons	Number of weeks in month
	—Open Hearth—		—Bessemer—		—Electric—		—Total—			
	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity		
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1942										
Jan. ..	6,328,126	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
Feb. .	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
Mar. .	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st quar	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April .	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May .	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43
June .	6,247,302	97.2	432,518	81.8	322,335	104.8	7,022,155	96.4	1,636,866	4.29
2nd qtr	19,194,385	98.5	1,361,155	81.2	975,818	104.6	21,531,358	97.4	1,654,985	13.01
1st half	37,889,027	97.8	2,798,856	83.9	1,882,364	101.5	42,570,247	96.9	1,645,545	25.87
July ..	6,350,047	95.7	453,684	79.6	345,093	96.3	7,148,824	94.5	1,617,381	4.42
Aug. .	6,420,496	96.6	467,313	81.8	345,642	96.3	7,233,451	95.4	1,632,833	4.43
Sept. .	6,297,201	98.0	437,950	79.4	331,933	95.7	7,067,084	96.5	1,651,188	4.28
3rd qtr.	19,067,744	96.8	1,358,947	80.3	1,022,688	96.1	21,449,359	95.5	1,633,615	13.13
9 mos.	56,956,771	97.4	4,157,803	82.7	2,905,032	99.5	64,019,606	96.4	1,641,528	39.00
Oct. ..	6,737,696	101.6	461,895	80.9	365,273	101.7	7,584,864	100.1	1,712,159	4.43
Nov. ..	6,378,661	99.1	458,426	82.9	347,473	99.9	7,184,560	97.9	1,674,723	4.29
Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production										
1941										
Jan. ..	6,274,780	99.0	451,806	76.0	195,766	89.1	6,922,352	96.8	1,562,608	4.43
Feb. .	5,669,425	99.1	378,536	70.5	182,393	91.9	6,230,354	96.5	1,557,589	4.00
Mar. .	6,457,641	101.9	460,225	77.4	206,137	93.8	7,124,003	99.6	1,608,127	4.43
1st quar	18,401,846	100.1	1,290,567	74.8	584,296	91.6	20,276,709	97.7	1,576,727	12.86
April..	6,137,613	100.0	395,056	68.6	221,510	104.1	6,754,179	97.6	1,574,401	4.29
May ..	6,362,245	100.4	444,079	74.7	238,241	108.4	7,044,565	98.5	1,590,195	4.43
June .	6,098,171	99.4	458,848	79.7	235,732	110.8	6,792,751	98.1	1,583,392	4.29
2nd qtr	18,598,029	100.0	1,297,983	74.3	695,483	107.8	20,591,495	98.1	1,582,744	13.01
1st half	36,999,875	100.0	2,588,550	74.6	1,279,779	99.7	40,868,204	97.9	1,579,753	25.87
July ..	6,085,100	94.4	489,297	85.0	237,827	85.7	6,812,224	93.3	1,541,227	4.42
Aug. ..	6,244,353	96.6	495,761	85 9	257,382	92.6	6,997,496	95.6	1,579,570	4.43
Sept. .	6,054,418	96.9	500,768	89.8	256,568	95.5	6,811,754	96.3	1,591,531	4.28
3rd qtr.	18,383,871	96.0	1,485,826	86.9	751,777	91.2	20,621,474	95.1	1,570,562	13.13
9 mos.	55,383,746	98.6	4,074,376	78.6	2,031,556	96.4	61,489,678	96.9	1,576,658	39.00
Oct. ..	6,423,329	99.4	533,090	92.4	279,679	100.6	7,236,068	98.9	1,633,424	4.43
Nov. .	6,194,679	99.0	488,822	87.5	277,384	100.0	6,960,885	98.2	1,622,584	4.29
Dec. ..	6,387,865	99.0	481,813	83.7	280,637	101.2	7,150,315	97.9	1,617,718	4.42
4th qtr.	19,005,873	99.1	1,503,695	87.8	837,700	101.6	21,347,268	98.3	1,624,602	13.14
Total..	74,389,619	98.8	5,578,071	80.9	2,869,256	97.9	82,836,946	97.3	1,588,741	52.14

The percentages of capacity operated in the first six months of 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941 as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

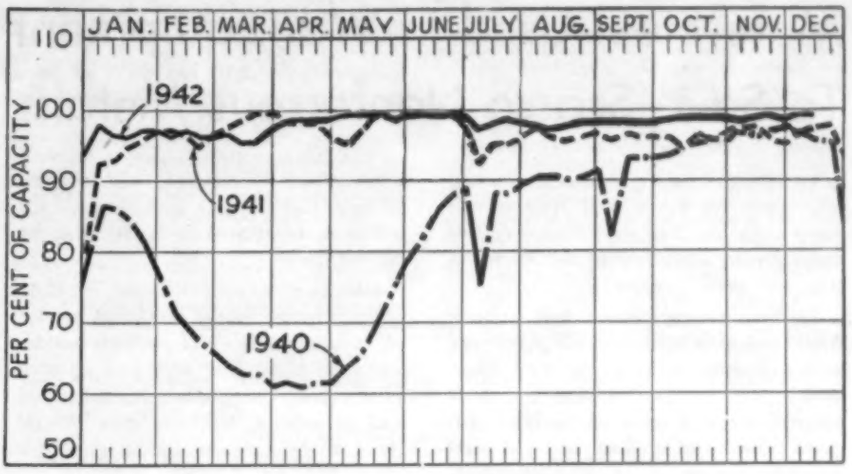
The percentages of capacity operated in the first six months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,250 net tons, bessemer 6,721,400 net tons, electric 4,225,890 net tons.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Dec. 12	Change	Same week 1941	Same week 1940
Pittsburgh	99	None	98	96
Chicago	101	+0.5	101.5	98
Eastern Pa.	96	None	87	95
Youngstown	97	None	92	92
Wheeling	86.5	+0.5	94	98.5
Cleveland	92.5	—1.5	94	86.5
Buffalo	90.5	None	79	93
Birmingham	95	None	90	97
New England	92	None	84	90
Cincinnati	92	None	91	87
St. Louis	94	None	96	87.5
Detroit	95	None	90	90
Average	99.5	None	*97.5	*95.5

*Computed on basis of steelmaking capacity as of those dates.



STEEL . . . . . STEADY

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99½ per cent. Two districts advanced, one declined and nine were unchanged. A year ago the rate was 97½ per cent; two years ago it was 95½, both computed on the basis of capacity as of those dates.

Pittsburgh — At 99 per cent for the second week, with few furnaces idle for repairs.

Wheeling — Gained ½-point to 86½ per cent.

Chicago — Rise of ½-point to 101 per cent, best in three weeks, resulted from return of open hearths to service.

Central eastern seaboard—Unchanged at 96 per cent, with scrap supply adequate for current needs.

St. Louis — Held at 94 per cent for the fifth week.

Buffalo — By quick repair of open hearths production has been maintained at 90½ per cent for six weeks, scrap being excellent.

Cleveland — Removal of an open hearth by one interest and slight curtailment by another caused the rate to drop 1½ points to 92½ per cent.

Cincinnati — With two open hearths idle for repair the rate held at 92 per cent.

Youngstown, O. — With 77 open hearths and three bessemers in production the operating rate remained at 97 per cent. Scrap is sufficient and labor supply is the principal restraining factor.

Detroit — Steady at 95 per cent, only repairs preventing capacity production.

Birmingham, Ala. — Steelmakers have managed to continue 23 open hearths in production, holding the rate at 95 per cent.

New England — Held steady at 92 per cent, with small repairs keeping rate down.

Collections of the various iron and steel salvage drives will be very close to its goal of 7,600,000 tons by Jan. 1, according to Lessing J. Rosenwald, director, Conservation Division, War Production Board. The various sections of the division sponsoring scrap drives report many sections are approaching their quota.

rials. Lukens specializes in steel plates—armor plate and in rolling heavy wide plates on its 206-inch plate mill.

Armor plate production increased more than 400 per cent over the prior all-time peak set in 1941. Rolling armor plate on its large plate mill, instead of using the slower forging process, eliminated a threatened bottleneck in providing armor for war vessels and accounts for the great increase in production. This material has been produced by rolling up to 9½ inches thick. Individual plates weighing over 100,000 pounds each have been rolled on the large plate mill, which produces material up to 195 inches wide.

Rolling a 106,000-pound ingot on the 206-inch mill, world's largest plate mill at Lukens Steel Co., Coatesville, Pa.

More Steel Used in War Equipment To Save Scarce Nonferrous Metals

TANKS and field guns that go roaring into battle for the United Nations will carry more iron and steel than ever this coming year, according to the American Iron and Steel Institute.

To conserve aluminum and copper, Army ordnance engineers are specifying ever-increasing numbers of steel functional parts as pinch-hitters for parts formerly made of other metals. This program, when fully in effect, will free 180,000,000 pounds of primary aluminum and as yet untotaled amounts of copper and copper alloys for war production jobs where they have been found indispensable.

Heavy ordnance equipment has for years been made of steel. But now many smaller component parts from cartridge cases — which liberated 591,000,000 pounds of copper—to sights, range-finders and fuses, are being converted to steel wherever possible without any sacrifice of military effectiveness or safety. Many are out-performing their predecessors.

A large plate for the firing platform of the 90-mm. antiaircraft gun when converted was expected to have slower firing action because of the relative heaviness of steel compared to aluminum. But, a thin, ribbed plate was designed, so light that the gun actually goes into action a few seconds faster than the former design.

Still more copper will be freed for other purposes by the conversion to steel of: A larger number of parts on medium and light tanks; fuse setters on all guns; bomb fuses; components of antiaircraft and 50-caliber machine gun mounts; parts of the carriages for all guns from 20 to 155-mm.

Many machine gun crews will find virtually their entire equipment made of steel—tripods, sights, swivels and components of the cooling system.

Key points at which steel is pinch-hitting for aluminum are: 140 individual parts on medium and light tanks; fins to guide mortar shells; "windshields" for long range, high velocity shells; mortar components; carriages for guns from 20 mm. to 155-mm.; components of anti-tank mines, fire control instruments, telescopes and range finders.

Although Army authorities are relying more than ever upon steel, they do not specify steel for any new use until it has passed a rigid test and satisfied every requirement. No sacrifice of performance is permitted.

U. S. Steel Chiefs Not Worried By Dwindling Iron Ore Supplies

PITTSBURGH

CHANGES in war production strategy ordered by the War Production Board are affecting the plant expansion program of United States Steel Corp., Irving S. Olds, chairman, and Benjamin F. Fairless, president, revealed at press conference when the corporation's directors met here last Thursday.

Some of the new facilities for making finished steel, chiefly armor plate for use in tanks, are being held up, they stated.

Despite rearrangement of the board's strategy—which is aimed at production of more of the things that are needed to wage offensive war—the corporation's backlogs of unfilled steel orders have not suffered noticeably, and the corporation's unfilled orders have changed little.

Neither Mr. Olds nor Mr. Fairless were perturbed about reports of dwindling reserves of high-grade iron ore.

Pressed for comment about the long-range effects of dwindling supplies of ore, Mr. Fairless said the supplies of "good-grade ore" would outlive all the reporters present at the press conference. He said he had been hearing dire predictions about iron ore reserves for practically every one of the 27 years he had been in the steel business.

There is also an abundant supply of steel scrap on hand at present, Mr. Fairless said, although he and Mr. Olds, stressed the necessity for continuing the drive for metal.

Efforts are still in progress to develop a satisfactory sponge iron process, Mr. Olds stated, but he pointed out that there were "287 such processes and none as yet is commercially feasible."

Mr. Olds declined to discuss the meeting of directors; "it merely took the place of the one that normally would be held in New York."

United States Steel Corp. subsidiaries are engaged in the greatest program of plant expansion in history in the Pittsburgh district, Mr. Olds revealed.

The Pittsburgh program, when completed, will cost $289,000,000, 66 per cent of which is for the account of the United States government. The corporation is also engaged in very substantial plant expansion programs in other districts.

It is expected that all of these Pittsburgh projects, which include vast expansions at Homestead, Duquesne and Edgar Thomson works of Carnegie-Illinois Steel Corp., will go into operation during the first half of 1943. The first unit of this program was brought in recently when a new electric furnace at Duquesne works began adding its tonnage of high-grade alloy steels to the war effort.

Carnegie-Illinois Steel Corp. since Pearl Harbor has established 187 all-time monthly production records, 60 in its blast furnaces, 34 in the steel producing departments and 93 on rolling mill units.

On five occasions since Dec. 7, 1941, this U. S. Steel subsidiary has broken its overall monthly blast furnace record for iron production and in each of four months its previous record for steel production was bettered.

Officials of Carnegie-Illinois anticipate that its total production of blast furnace products in the year 1942 will be three-quarters of a million tons higher than in the year 1941, and that its output of steel ingots this year will be more than 750 tons higher than last year.

In November, eight new all-time monthly production records were established; three new blast furnace marks being set, and one steel producing shop and four rolling mill units also sharing the honors.

Other wartime accomplishments by United States Steel subsidiaries in general were outlined in a press release issued by the corporation earlier in the week (see page 60).

Steel Corp. Shipments Set New High for 11 Months

Finished steel shipments by United States Steel Corp. subsidiaries in November totaled 1,665,545 net tons, a decrease of 121,956 tons from the October figure but an increase of 41,359 tons over November, 1941. For 11 months shipments aggregated 19,214,522 tons, compared with 18,612,901 tons in the comparable period last year. Both the November and 11-month shipments were new records for those periods.

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942

M ORDERS

M-61 (Amendment): **Graphite,** effective Dec. 4. Extends complete control over distribution and use of all graphite which will stand on a number 50 mesh screen. Requires specific WPB authorization to put into process any strategic graphite; to deliver (except by a jobber) any crucible or other product containing graphite.

M-253: Lithium Ores, effective Dec. 5. Requires specific WPB authorization to deliver or use lithium ores. By Dec. 20 and 10th of each succeeding month suppliers must file with form PD-728 and consumers must file PD-729.

M-257: Sulphuric Acid, effective Dec. 5. Provides allocation control for sulphuric acid, including oleum and spent acid. WPB will issue directions when and as needed, covering deliveries to be made and uses to be permitted or prohibited. Producers of sulphuric acid and all others who deliver spent sulphuric acid must file form PD-601 by the 10th of each month with WPB.

L ORDERS

L-5-c (Amendment): **Mechanical Refrigerators,** effective Dec. 8. Restricts sales of refrigerators frozen in manufacturers' stocks without specific authorization to Defense Supplies Corp.

L-216: Portable Tools, effective Jan. 1. Enables Director General, WPB, to issue schedules for standardization and simplification of portable tools. Schedule I lists the universal portable electric tools that are affected by the order, the sizes and models in these sizes which may be manufactured, and limits the length of the cable or electric cord to be used to carry power to such tools.

L-221: Electric Motors, effective Dec. 2. Prohibits delivery of motors unless they comply with certain standard specifications and are of the simplest practicable, mechanical and electrical design. Requires purchaser to certify why he must have a motor of a certain type. Restricts use of such special types to the conditions and the purposes for which they are required. Purchaser must certify also that he has made every reasonable effort (1) to adapt idle motors or generators in his possession, (2) to obtain used ones for his purpose, and (3) to repair or recondition his existing equipment.

L-223: Hard-Surfacing Material, effective Dec. 2. Restricts delivery to orders rated AA-5 or higher, except for research work or field tests. Restricts use for maintenance and repair purposes to a specific list of essential types of equipment. Limits use for new products to those specifically permitted by the order and inventories to a 60-days' supply. Producers must file monthly reports with WPB on forms PD-733, 734, and 735.

L-227: Fountain Pens and Pencils, effective Dec. 7. Limits production. Prohibits use of iron, steel, copper, copper-base alloys, crude rubber or reclaimed rubber in manufacture of fountain pens, except: low carbon steel for functional parts other than pen nibs; copper contained in 14 kt. gold pen nibs; stainless steel pen nibs which were held in inventory in completely fabricated form prior to Dec. 7 may be assembled through Dec. 31. Use of the same materials in manufacture of mechanical pencils also prohibited, except: low carbon steel for functional parts, provided that no more than 8 lb. shall be contained in each group of 1000 pencils produced after Feb. 1, 1943. Use of same materials completely banned in manufacture of wood-cased pencils.

OPA Supplementary Order

No. 31: Tax on Transportation of Property, effective Dec. 1. Tax, imposed by section 620 of the Revenue Act of 1942 shall be treated as though it were an increase of 3% in the amount charged for transportation and not as a tax for which a charge may be made in addition to the maximum price. This order does not apply to price regulations: No. 4, Iron and Steel Scrap; No. 112, Pennsylvania Anthracite; No. 120, Bituminous Coal Delivered from Mine or Preparation Plant; No. 121, Miscellaneous Solid Fuels Delivered from Producing Facilities; No. 122, Solid Fuels Delivered from Dealers; No. 189, Bituminous Coal Sold for Direct Use as Bunker Fuel; No. 236, Heating Boiler Conversion Parts.

PRICE REGULATIONS

General Maximum Price Regulation (Amendments). Effective Dec. 8, provides that maximum price for ferrosilicon of a West coast seller shall include an allowance for actual freight which need not exceed freight from Niagara Falls to St. Louis plus the federal tax on this freight, which became effective Dec. 1.

No. 4 (Amendment): **Iron and Steel Scrap,** effective Dec. 1. Authorizes sellers to pass on to consumers the 3 per cent property transportation tax imposed under the 1942 revenue act. Makes several changes to facilitate the movement of steel scrap from water shipping points.

No. 113 (Amendment): **Iron Ore Produced in Minnesota, Wisconsin and Michigan,** effective Dec. 1. Authorizes ore owners to pass along to ore buyers the exact increase in the established lake freight rate for ore shipped during December.

No. 124 (Amendment): **Rolled Zinc Products,** effective Dec. 9. Directs that cash and trade discounts which prevailed Oct. 1, 1941, shall not be lowered. Requires producers to file report imparting certain information to WPB by Jan. 8. Includes maximum prices for zinc plates and zinc engravers' plates in an enumerated list of products to whose prices permissible extra charges may be added.

No. 136 (Amendments): **Machines and Parts.** Effective Dec. 11, gear and speed reduction items of all types will be priced under this order, revoking price schedule No. 105. Maximum prices for gears, pinions, sprockets and speed reducers will continue to be those charged on Oct. 15, 1941, except for use in military equipment; automotive or tractor transmissions, transfer cases, power take-offs, differentials, and axle assemblies; for use in private or commercial vehicles which may use as maximums their prices on March 31, 1942.

Retroactively effective to Nov. 7, increase in maximum price authorized for automotive replacement batteries is extended to all other types of lead-acid storage batteries regardless of use. The new ceiling is the maximum price determined under other provisions of the order plus 1 cent per pound of lead content in the battery.

SECOND SECTION

A separately bound Section Two of this issue of STEEL is devoted to "Priorities — Allocations — Prices". This includes a description of the new Controlled Materials Plan, announced recently by WPB, with detailed instructions for preparing bills of materials required under the plan. The section also includes digests of the important orders and regulations issued by WPB and OPA, an index of PD forms and a tabulation of WPB and OPA personnel. Extra copies in lots of 10 or less are available free of charge to STEEL'S subscribers; otherwise, the price is 10 cents per copy.

Builders' Hardware Lines Reduced From 37,000 to 3500 Items

In one of the most extensive simplification programs yet announced by the War Production Board in the realm of manufacture, builders' hardware lines are reduced to approximately 3500 items from a present total of 27,000, under the provisions of Schedule I of Limitation Order L-236, issued last week by the director general for operations.

The effective date of the order is Jan. 15, 1943. Producers are prohibited from putting into process after that date any builders' finishing hardware which does not conform to the permitted sizes, types, grades, finishes, weights and standards.

An interval will be allowed following the effective date during which manufacturers may assemble, from completed parts in inventory, designs and types not included in Schedule I. After March 1, 1943, however, producers' inventories of finished parts for non-standard types, sizes, and styles will be frozen.

Merchandise lines covered by the order include lock sets, door trim, hinges of various kinds, door knobs, key plates, door pulls, door bolts, hydraulic door closers, window and transom hardware, screen door accessories, casement window fittings, cabinet hardware and locks, sash balances, padlocks, track and accessories.

Customers of retail stores will still be able to satisfy their essential needs for common types of builders' hardware. Approved styles and types will be of uniformly simple design and finish, however.

Steel's 1941 Repair Bill Up 35 Per Cent

Nearly $420,000,000 was spent by the steel industry in 1941 for repairs and maintenance, American Iron and Steel Institute reported last week. This exceeded by more than 35 per cent the $305,000,000 in 1940, and is almost two and one-half times the amount spent in 1938, the last year of world peace.

Plant maintenance costs in 1941 averaged about $6.80 for each ton of finished steel produced, an increase of 50 cents a ton over 1940.

MEN of INDUSTRY

A. R. Abelt, secretary, Chain Belt Co., Milwaukee, has been elected a vice president and a director, to succeed the late F. J. Weschler. In 1922 he was made sales manager of the Chain Belt and Transmission Division, retaining that post until early this year when he became manager of that division. He has been secretary since 1930. **G. D. Gilbert,** sales manager, Baldwin-Duckworth Division, Springfield, Mass., has been made general manager there, and also elected secretary to succeed Mr. Abelt.

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John H. Sipchen has been named first assistant to the president, Anker-Holth Mfg. Co., Chicago. He will have charge of production and the development of air and hydraulic operated chucks, fixtures and devices. Mr. Sipchen was formerly vice president in charge of sales, engineering and production for Manufacturers' Equipment Co., Chicago, and previously had similar duties as vice president and general manager for Hannifin Mfg. Co., Chicago.

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C. H. Ellingboe, heretofore purchasing agent, Toro Mfg. Co., Minneapolis, has joined Pioneer Engineering Co., Minneapolis, as purchasing agent.

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C. R. Dobson has been appointed chief industrial engineer, Jones & Laughlin Steel Corp., Pittsburgh, under the vice president in charge of operations, **S. S. Marshall Jr.** Mr. Dobson succeeds **Lauson Stone,** resigned. He joined Jones & Laughlin in 1920 as an industrial engineer, and since 1930 has been assistant to Mr. Stone.

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Walter E. Gibson, formerly advertising manager, Swartzbaugh Mfg. Co., Toledo, O., has joined the advertising staff of Detroit Rex Products Co., Detroit.

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Rudolph B. Flershem, formerly general manager, Buffalo Bolt Co., North Tonawanda, N. Y., has been elected president, succeeding **Raymond K. Albright,** who has become chairman of the board.

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John E. Neumann has been elected president, Anderson Stove Co. Inc., Anderson, Ind. **Wilbur J. Birkenmeier** and **Marion Collins** have been elected vice president and secretary-treasurer, respectively.

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T. L. Haines, sales representative, Vascoloy-Ramet Corp., Chicago, has been elected secretary, Chicago chapter, American Society for Metals, succeeding **A. A. Engelhardt,** sales representative, Eclipse Fuel Engineering Co., Chicago, who has resigned to enter military service.

A. R. ABELT

JOHN H. SIPCHEN

C. R. DOBSON

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Alfred Marchev, vice president and assistant general manager, Republic Aviation Corp., Farmingdale, Long Island, N. Y., has become general manager of the company's Farmingdale plant. Mr. Marchev joined the organization last February as assistant to the president, later becoming vice president and assistant general manager. Before that he was chief engineer, works manager and director, Signode Steel Strapping Co., Chicago.

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James M. Hait, for many years chief engineer of the Peerless Pump Division of Food Machinery Corp., Los Angeles, has been appointed general manager, Food Machinery Corp., Division of Procurement and Engineering, a newly created division.

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Harry S. Zane Jr., vice president, Guiberson Corp. and Guiberson Diesel Engine Co., Dallas, Tex., and manager of the companies' offices in Chicago since 1940, has been appointed chairman of a new management committee to direct the expanding operations of the two companies.

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Martin A. Hotham has been appointed production engineer, Follansbee Steel Corp., Follansbee, W. Va. Mr. Hotham has spent his entire career in the steel industry, and formerly supervised steel production and open-hearth operations for American Tube & Stamping Co., Bridgeport, Conn.

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Alvin A. Borgading, since 1939 assistant to the purchasing agent, American Car & Foundry Co., New York, has been promoted to purchasing agent. Mr. Borgading has been associated with the company 35 years. **Herbert Streader** has been named assistant purchasing agent and placed in charge of the Material Control Division set up under WPB's Controlled Materials Plan. **George W. Brown** continues as assistant purchasing agent.

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L. B. Neumiller, president, Caterpillar Tractor Co., Peoria, Ill., has assumed the added responsibilities of president of Caterpillar Military Engine Co., Decatur, Ill., a subsidiary. He succeeds **B. C. Heacock,** who has become deputy director for the distribution bureau, War Production Board, Washington. **T. R. Farley,** vice president in charge of operations for the Peoria factory, will continue in that capacity with the title of executive vice president.

Added to the executive staff at Decatur is **W. O. Bates Jr.,** newly elected vice president of Caterpillar Military Engine Co. He formerly was a vice president of Caterpillar Tractor.

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A. H. B. Jeffords, management engineer, Trundle Engineering Co., Cleveland, has been appointed a vice president, and will specialize on war production rules, regulations and requirements. A

graduate in mechanical engineering from Massachusetts Institute of Technology, Mr. Jeffords joined Trundle Engineering in 1924.

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N. M. Forsyth, general sales manager, Pump Engineering Service Co., division of Borg-Warner Corp., Cleveland, has been made vice president in charge of sales.

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William H. Knight, formerly vice president, Electric Household Utilities Corp., Chicago, has been named director of sales and market research, Elastic Stop Nut Corp., Union, N. J.

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Charles G. Pyle, general sales manager, Sylvania Electric Products Inc., has been named managing director, National Electrical Wholesalers Association, New York.

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George J. Taylor, industrial lighting engineer at the Nela Park plant of General Electric Co., Cleveland, has been promoted to the post of wartime lighting engineer at the company's Atlantic Division, New York.

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Joseph L. Overlock, since last April regional director, War Production Board, Chicago, has resigned to return to his former position as vice president, Continental Illinois National Bank & Trust Co., Chicago. **A. T. Kearney,** chief deputy WPB director, Chicago, will succeed Mr. Overlock as regional director.

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L. R. Howes, associated with the rubber industry 28 years, has been named sales engineer for the automotive and aeronautic departments of the national sales and service division of B. F. Goodrich Co., with headquarters at 5400 East Olympic boulevard, Los Angeles.

M. G. Huntington, identified with B. F. Goodrich since 1923, has been made manager of the Washington office of the national sales and service division. He succeeds **K. D. Smith,** who assumes new duties at Detroit.

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Sherman K. Burke, assistant vice president, Southern Pacific railroad, has been named general traffic manager, with headquarters in Chicago, succeeding **W. W. Hale,** recently transferred to San Francisco as vice president in charge of freight traffic. **D. J. McGanney,** freight traffic manager of the central district, succeeds Mr. Burke as assistant vice president. **F. C. Nelson** succeeds Mr. McGanney as freight traffic manager, central district, and **L. A. Brockwell,** replaces Mr. Nelson as assistant to the freight traffic manager in charge of rates and divisions.

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Walter Dorwin Teague, 444 Madison avenue, New York, industrial designer, announces appointment of **Leo H. Rich** to his staff for the development of a post-war planning program, to assist industry in preparing for the post-war readjustment period, to plan for reconversion of war-time machinery to peace-time production, and to assist in designing peace-time products. Mr. Rich formerly was president of Rich Co. Inc., director of design for Revere Copper & Brass Inc., and general manager of Oscar B. Bach, crafts-man-in-metal.

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D. P. Brannin, heretofore in charge of metal sales in the Chicago area for New Jersey Zinc Sales Co., has been appointed district sales manager of the Pigment and Metal Sales Divisions, with headquarters in Chicago. **J. P. Dunphy,** of the New York sales department, has been named district sales manager, Pigment Division, with headquarters in New York.

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Charles L. Huston Jr., director of personnel relations, Lukens Steel Co., Coatesville, Pa., and a member of the company's board of directors, has been appointed assistant to the president. He joined Lukens as director of personnel relations in September, 1939, after serving ten years with American Rolling Mill Co., Middletown, O.

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William C. Carter, for 14 years vice president and the past year executive vice president, Link-Belt Co., Chicago, has been elected president, effective Dec. 31. He succeeds **Alfred Kauffmann,** who has resigned because of ill health. Mr. Kauffmann remains a member of the board of directors. Mr. Carter has been associated with the company since 1902.

OBITUARIES . . .

Albert Kahn, 73, founder of Albert Kahn Associated Architects and Engineers, Detroit, and one of the best known industrial architects in the world, died in that city, Dec. 8. Recent Kahn designs include the Martin Aircraft plant at Baltimore, the Ford Willow Run bomber plant, Chrysler Tank Arsenal, Hudson Naval Ordnance plant, and innumerable buildings, military bases and related structures throughout the United States, England, Scotland, Japan, China, Egypt, Mexico and South America. Russia has more than 500 Kahn-designed factories. He was a brother of Julius Kahn, founder and former president of Truscon Steel Co., who died recently.

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Adolph L. de Leeuw, 81, vice president, Goss & de Leeuw Co., New Britain, Conn., consulting engineer, inventor and author of numerous engineering articles, died Dec. 5 in Plainfield, N. J. He joined Goss & de Leeuw in 1923, and among his outstanding inventions was a milling cutter of the wide spaced type. For many years he maintained an office in New York as consulting engineer, specializing in plant management and production.

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H. E. Richardson, 57, Philadelphia sales manager, Youngstown Sheet & Tube Co., and president, Steel Club of Philadelphia, died in that city recently. Born and educated in Philadelphia, he had been associated with Youngstown Sheet & Tube 29 years, all of which time was spent in the Philadelphia office.

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Claude Rorabeck, 63, president, Link-Track Engineering Co., Chicago, died Dec. 4 when the automobile he was driving crashed into a parked truck near Chicago Heights, Ill.

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William R. Kales, 72, president of Whitehead & Kales Co., Detroit, and a well known structural steel engineer, died in that city Dec. 3. He was a member, American Society of Civil Engineers, American Society of Mechanical Engineers and the Engineering Society of Detroit, being a past president of the latter organization.

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George T. Burrell, 69, former president, Burrell Engineering & Construction Co., died Nov. 25, in Kenosha, Wis.

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C. C. Dornbush, 67, for 40 years sales engineer for Jones & Laughlin Steel Corp., Pittsburgh, died Dec. 2 in that city.

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John A. Crowley, 49, regional supervisor and Chicago district manager, J. B. Ford Sales Co., Wyandotte, Mich., died in Chicago Dec. 2.

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Vincent M. Yates, 56, an executive in the lamp division of General Electric Co., New York, died in that city Dec. 7. He had been associated with General Electric 33 years.

WINDOWS of WASHINGTON

Committee for the Review of Data Requests from Industry eliminates, simplifies 40 per cent of voluminous WPB forms. Bureau of the Budget studies all forms. Foreign-owned patents available

WHEN the War Production Board's Committee for the Review of Data Requests from Industry started to function July 1 it went directly to industry itself for complaints and suggestions. It first approached some 1200 trade associations, following with direct contacts with individual companies.

Surprisingly enough, it was found that there were relatively few complaints about the number of forms to be filled out. Less than 5 per cent were complaints of the number of forms, excepting where duplication existed. The other 95 per cent were criticisms of conflicting instructions, ambiguous phrases, meaningless data, unavailable information, oversized forms, receipt of forms not applicable to the particular business.

Since the Committee for the Review of Data Requests was appointed, approximately 40 per cent of the War Production Board's requests have been eliminated or simplified. With the hearty co-operation of the industry branches of the War Production Board, 120 forms were abolished and 132 simplified.

Conplaints Get Results

A large automobile company complained that the preparation of forms in its hands at the moment would cost $125,000, with an estimated consumption of more than 100,000 man hours. A tool company in the Middle West declared that it was "furnishing the War Production Board in four or five different forms practically the same information, but each time dated a little differently, put on a different form, and arranged differently." Complaints such as these brought elimination of duplications by combining the legitimate requests for the same information from different branches into one form.

Certain impossible questions were eliminated or reworded, such as the one that originally asked the respondent to answer "yes" or "no" to the question "Is additional skilled labor available, or must it be trained?" There are many questions about the meaning of portions of forms due to variations in wording. The trouble has been cured by using the same language for repetitive clauses such as certifications and recitals of the criminal code. There was a good deal of complaint about odd-size forms which had to be filled out on wide-carriage typewriters. All WPB forms now are designed so as to conform to both the width and the spacing of a standard-carriage typewriter, and are printed on paper thin enough for use with carbons but sufficiently opaque so that both sides can be used.

Elimination of one column alone in WPB-732 relieved approximately 12,000 companies from endeavoring to furnish data in connection with the breakdown in man hours applicable to the priority ratings on their products; the task had proved a nuisance to many companies because the information was not readily available and in some cases could not be computed.

A simplification of substantial benefit to the chemical industry was the creation of standard forms PD-600 and PD-601. Before final adoption, these proposed forms were studied by a special subcommittee in which representatives from the chemical industry participated. As a result of a joint agreement between industry and the chemical branch, approximately 40 per cent of the content of the forms was eliminated and arrangements made for the new forms to replace scores of individual ones already in existence, as well as to serve as the standard reporting medium for various other chemicals if it should be required to put them under allocation. This enabled the manufacturers to set up standard accounting and reporting procedures for all of the chemicals reported on PD-600 and PD-601.

Similarly, the rubber industry was relieved of the need for supplying monthly inventory reports showing a detailed breakdown by sizes, types and classified by types of consumers. Instead, this industry merely reports monthly the total units of production, shipments and inventories by type only, and makes its detailed reports only four times a year when the necessary information is already available from normal accounting records.

Relief for Steel Plants

As a result of meetings with representatives of the United States Steel Corp., Bethlehem Steel Co., Republic Steel Corp., and Inland Steel Co., agreements were reached which have relieved the steel industry from the necessity of making hundreds of thousands of entries monthly.

Several companies advised that they were requested to fill out forms which, while not issued by the War Production Board, stated that the information was being secured at the Board's request. In each instance the committee studied these "bootleg" forms and eliminated them.

It is estimated in a report recently released by the Office of War Information that the overall accomplishment of the Committee for the Review of Data Requests from Industry is saving American industry a minimum of 30,000,000 man hours annually, the equivalent of at least 15,000 office workers, working every week in the year. Thus the pressure on office help, which was so materially increased in the initial stage of our defense period, has been ameliorated to some degree. At least, this program of elimination and simplification of forms is giving them more time to attend to other duties.

The committee points out that more new forms can be expected as more wartime controls come into being. They will be formulated and published under a centralized control. Effective Sept. 1, no division or branch of the War Production Board may issue a form requesting information from industry without approval by the Committee and the Bureau of the Budget, and the Administrative Division is on guard against having any forms printed that do not have such approval. In addition, all errant mimeographing machines have been taken into custody by the Administrative Officer.

Budget Bureau "Polices" Forms

A somewhat similar control over all government data requests has been put into effect by the Bureau of the Budget, as outlined in their Circular No. 360, Supplement 1, which provides that all "report forms" or other "written or oral requests" which call for answers for identical information upon identical items "from any group of ten or more respondents in the United States" shall be passed upon by the Bureau of the Budget. After Dec. 31 every copy of approved printed forms will bear the Bureau of the Budget serial number and expiration date.

Forms which have been officially approved by the War Production Board and the Bureau of the Budget are listed monthly in a publication entitled "Priorities", copies of which are available for inspection in all regional and district offices of the War Production Board.

Although a few forms, because of their confidential nature or for other special reasons, will not be included in any published list, their legitimacy will be indicated by the Bureau of the Budget serial number after Dec. 31, 1942. In the meantime, business men having any doubts about a form which does not bear the Bureau of the Budget serial number

No pause need refresh them

When time, space and manpower are precious, the tireless performance of fast, dependable multiple spindle automatics is appreciated.

Although machines may not tire, their operators often do. Simplicity and convenience of operation are important factors of a good machine.

The Departmental Design of a Conomatic contributes much to its efficiency and ease of operation. The tooling area, work-head, overhead camshaft, and controls, are in orderly arranged units, conveniently accessible from either side of the machine.

These conveniences contribute to the effective results that good operators are getting from 4, 6 and 8 Spindle Conomatics.

Prime your production pulse by specifying CONES.

Cone Automatic Machine Co., Inc., Windsor, Vermont

and which is not listed in "Priorities" should seek advice at district offices.

Another step in simplification has been put into effect by a co-operative arrangement worked out between the Government Printing Office, the editors of the *Federal Register* and James G. Robinson, WPB's Administrative Officer, which enables copies of orders to be printed and distributed within 24 hours after they have been finally approved. Under the law it is required that official orders be printed in the *Federal Register*. Up until July 5 of this year frequently forms and orders were not available until a considerable time after they had been published. Now, under the new arrangement, copies of orders are printed on plates borrowed from the *Federal Register*, which not only enables them to be immediately available but eliminates any possibility of typographical errors resulting from variations between the individual copies of the orders and the official text at it appears in the *Federal Register*.

The business of printing and distributing WPB forms is well organized and functions with extreme speed and efficiency. Galley proofs turned over to the Government Printing Office up to 5 o'clock each day are handled with such speed that printed copies can be rushed into the mails, thus permitting distribution the next day to addresses as far west as Chicago and St. Louis. To appreciate the magnitude of this work, it may be said that as many as 9,000,000 impressions of WPB orders and forms can be printed within 24 hours.

Joseph I. Lubin, chairman of the Committee for the Review of Data Requests from Industry, a certified public accountant with wide background of experience, holds that the influence of government reporting procedures on accounting practices will carry over into the peacetime period ahead.

"Out of the adapted and the new record keeping systems will come information which can be used by private management now and in the peace to come," he said recently in an address before the American Institute of Accountants.

"If the necessities of wartime accounting present a tough problem, they also present a good opportunity. They will provide the tools for better management control. A number of accountants already have grasped the significance of this possibility. They are expanding and unifying their records, examining their inadequacies and their blind spots, and making plans to use the new information for smoother operation under the existing priorities and allocations systems and for better management control in the postwar period."

Foreign-Owned Patents Made Available to American Industry

ENEMY-OWNED patents will be made "readily and freely available forever to American industry," Leo T. Crowley, alien property custodian, announced last week. He added that plans are being made to "encourage the research necessary to develop them."

Unless American companies hold exclusive rights to their use, granted before the war, licenses will be issued on application "to any legitimate business concern on a royalty-free basis for the life of the patent."

Patents held by citizens of the occupied countries are to be treated similarly, except that if they are used after the war emergency has ended, reasonable royalties will be collected.

In case where exclusive-use licenses already are in existence, the royalties involved will be collected by Crowley's office. But the licensee will have the option of cancelling his exclusive contract, and taking instead a standard non-exclusive royalty-free license.

Mr. Crowley, in a letter to the President, said that by Dec. 31, his office will have taken control of 50,000 foreign-owned patents. These represent some of the finest research achievements of modern science, particularly in the production of dyestuffs, plastics, pharmaceuticals and electric goods.

Manufacturers will be apprised of the nature of these patents through classified lists some of which now are ready for distribution.

"Every effort will be made," Mr. Crowley says, "to bring these patents to the attention of small business as well as large, thus building up our national productive capacity and stimulating the fullest use of modern technique."

Brass ingot makers and brass foundries are to report their inventories of ingot to the WPB on two new forms now mailed. Ingot makers will report on PD-751 and foundries on PD-59-b. From these reports the Copper Branch will be able to learn how long ingot is being held which cannot be used for war orders on hand.

DENY ARMY OVEREXPANDED PLANT CONSTRUCTION

DENIAL that the Army has overexpanded its plant construction was made before the Senate Small Business committee last week by Lieut. Gen. Brehon Somervell, left, commanding services of supply, and Maj. Gen. Levin H. Campbell, Chief of Ordnance. NEA photo

Over 1000 To Produce Special Maintenance Tools for War Vehicles

TO UTILIZE facilities of more than 1000 small plants throughout the country not now producing war materials, the Ordnance Department Tank-Automotive Center in Detroit is engaged in a program to convert them to the manufacture of special maintenance tools for combat vehicles.

Over 200 plants of the small machine shop type throughout New England, New York, New Jersey, Pennsylvania and Ohio are now participating in this operation. It is anticipated that 300 more will be converted to this work within the next 90 days.

C. B. Smith, director of the tool and equipment section of the Center, reports that most of these plants had only minor adjustments to make to adapt their operation to the manufacture of special maintenance tools. A careful study of the facilities available made it possible to assign to each manufacturer the tools he was best fitted to make with equipment that was available, and which would require the least change to get in immediate operation.

Special maintenance tools are not standard products of the tool industry, which is now working to capacity on war orders for standard tools. Even though it was not possible in some cases for the small plants to produce the entire tool, or set of tools, arrangements have been made to subcontract a portion of the prime contract so that all may participate.

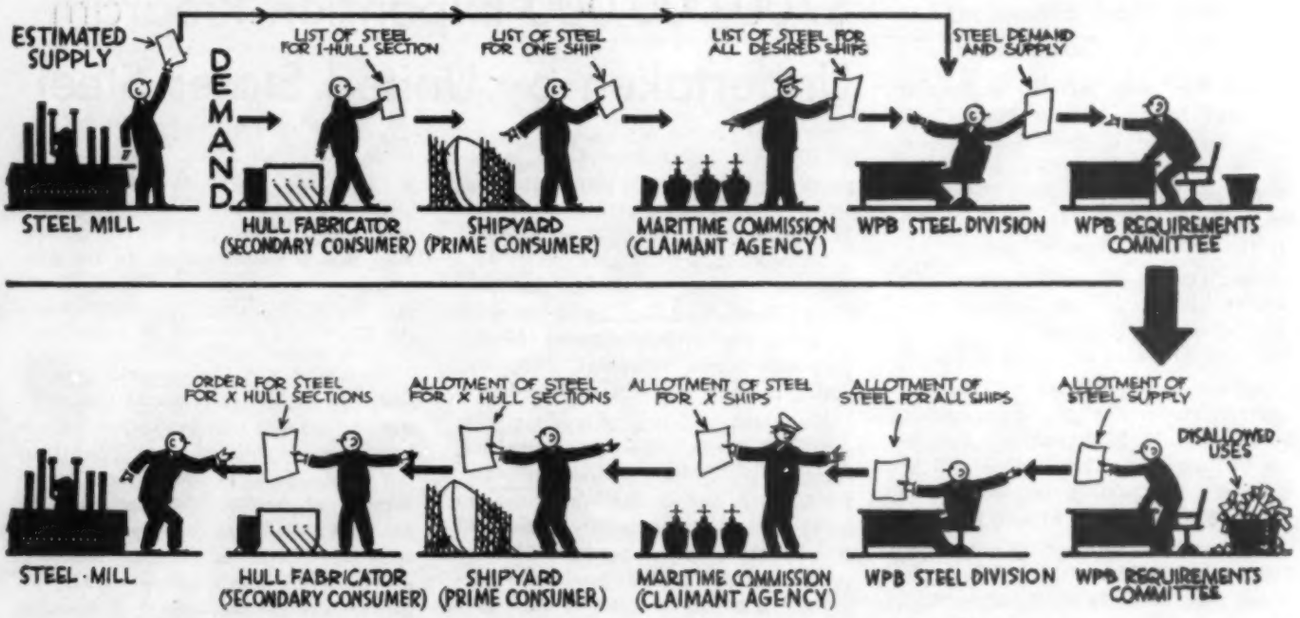
System of industrial integration committees used by the Ordnance Department will be expanded in future months as a result of recent conference at the Tank-Automotive Center, it was announced by Brig.-Gen. A. R. Glancy, deputy chief of ordnance in charge of the Center. Integration committees comprise manufacturers doing work for the Tank-Automotive Center. The committee system enables various plants making one product to work together much as though they were a single unit.

As an example, the medium tank committee composed of all private plants manufacturing the medium tank, enables the members to deal directly with one another in exchanging parts, raw materials, machine tools or improved methods of production.

Gen. Glancy also announced the formation of a new committee—the Self-Starter committee. There are seven others: Medium Tank, Light Tank, Half Track, Armor Plate, Armor Castings, Power Train, and Track.

Charles E. Wilson, WPB production vice chairman, has appointed Ralph J. Cordiner as WPB director general for war production scheduling. Mr. Cordiner for the last three years has been president, Schick Inc., Stamford, Conn.

HOW CONTROLLED MATERIALS PLAN BALANCES SUPPLY AND DEMAND


ESTIMATED SUPPLY
DEMAND
LIST OF STEEL FOR 1-HULL SECTION
LIST OF STEEL FOR ONE SHIP
LIST OF STEEL FOR ALL DESIRED SHIPS
STEEL DEMAND AND SUPPLY
STEEL MILL
HULL FABRICATOR (SECONDARY CONSUMER)
SHIPYARD (PRIME CONSUMER)
MARITIME COMMISSION (CLAIMANT AGENCY)
WPB STEEL DIVISION
WPB REQUIREMENTS COMMITTEE
ORDER FOR STEEL FOR X HULL SECTIONS
ALLOTMENT OF STEEL FOR X HULL SECTIONS
ALLOTMENT OF STEEL FOR X SHIPS
ALLOTMENT OF STEEL FOR ALL SHIPS
ALLOTMENT OF STEEL SUPPLY
DISALLOWED USES
STEEL MILL
HULL FABRICATOR (SECONDARY CONSUMER)
SHIPYARD (PRIME CONSUMER)
MARITIME COMMISSION (CLAIMANT AGENCY)
WPB STEEL DIVISION
WPB REQUIREMENTS COMMITTEE

HOW the supply of steel, aluminum and copper are forced into balance with the demand is illustrated by the above sketch showing operations of the Controlled Materials Plan.

1. The producers of these metals will report the available supply and rate of output for the coming quarter to the Controlled Materials Divisions.

2. The secondary consumer will send Bills of Materials covering his requirements to his prime consumer.

3. The prime consumer will gather all of these bills of materials together with his own and will send a total summary to the claimant agency.

4. The claimant agency will then multiply these requirements by the contemplated program and will send the grand total to the Requirements Committee.

5. The Requirements Committee will adjust the demand with the available supply and issue the allotments.

6. The claimant agency will receive the adjusted allotments and pass them on to the prime consumer in the form of adjusted approval schedules.

7. The prime consumer will divide his allotments with his various secondary consumers.

Orders are then placed with the mills bearing allotment numbers, which will assure delivery of that material in the approved period.

Building of Chicago Detinning Plant Gets Underway This Week

CONSTRUCTION of the government-financed detinning plant to be located in Chicago and operated by the Metal & Thermit Corp. will get underway about Dec. 15. H. K. Ferguson Co., Cleveland, has the contract, and purchase of the site has been completed.

The plant, which will be similar to others planned for Buffalo, Birmingham, Los Angeles and Dallas, will occupy a 18-acre site on the southwest side of the city along the drainage canal. It will have a floor area of 50,000 square feet.

Tentative construction plans call for seven buildings, to be put up with non-critical materials such as concrete masonry and timber. Operations are expected to start next spring or summer.

The plant will have capacity to handle 60,000 tons of tin cans a year. A ton will yield 23 pounds of grade A tin and 1970 pounds of steel scrap. Seven pounds of metal are lost in the chemical process.

New War Plant Expansions Authorized by Government

New war plant facilities authorized last week by the Defense Plant Corp. were announced by Jesse Jones, secretary of commerce. In each case title will be retained by Defense Plant Corp. and the facilities will be operated by the private operator. They include:

Execution of a contract with Simmonds Aerocessories Inc., New York, to provide facilities in New York. The cost is estimated to be in excess of $150,000.

Increase in its contract with Liberty Aircraft Products Corp., Farmingdale, Long Island, N. Y., for additional facilities in New York. This increase will be in excess of $300,000, resulting in an overall commitment of $1,900,000.

Increase in its contract with the Ford Motor Co., Dearborn, Mich., for additional plant facilities in Michigan. This increase will be in excess of $75,000, making a total commitment of more than $250,000.

Increase in its contract with Fairchild Engine & Airplane Corp., Hagerstown, Md., for additional plant facilities in North Carolina. The increase will be in excess of $300,000, making a total commitment of more than $3,000,000.

Increase in its contract with Owens-Corning Fiberglas Corp., Toledo, O., for additional plant facilities in Ohio. This increase will be in excess of $500,000, making an over-all commitment of more than $1,800,000.

Increase in contract with Ex-Cell-O Corp., Detroit, for additional facilities in Michigan. This increase will be in excess of $450,000, resulting in an overall commitment of more than $8,000,000.

Increase in contract with Hudson Motor Car Co., Detroit, for additional facilities in Michigan. This increase will be in excess of $600,000, resulting in an overall commitment of more than $1,000,000.

Execution of a contract with Commodity Credit Corp., Washington, to provide for construction and equipment of a plant in Illinois at a cost in excess of $350,000.

Execution of a contract with Commodity Credit Corp., Washington, to provide for construction and equipment of a plant in Kentucky at a cost in excess of $350,000.

Execution of a contract with Addressograph-Multigraph Corp., Cleveland, to provide machinery and equipment in a plant in Ohio at a cost in excess of $350,000.

Execution of a contract with General Cable Corp., New York, to provide machinery and equipment in a plant in New York at a cost in excess of $800,000.

Execution of a contract with Sangamo Electric Co., Springfield, Ill., to provide machinery and equipment to be placed in a plant in Illinois.

Execution of contract with Eastern States Petroleum Co. Inc., New York, to provide machinery and equipment in a plant in Texas at a cost in excess of $1,500,000.

Execution of contract with International Business Machines Corp., New York, to provide machinery and equipment in a plant in New York, at a cost approximating $1,000,000.

Execution of a contract with Cornell-Dubilier Electric Corp., South Plainfield, N. J., to provide additional facilities in a plant in Massachusetts at a cost in excess of $250,000.

$700,000,000 Expansion Program Undertaken by United States Steel

"UNITED States Steel Corp. is engaged in the greatest plant expansion project in its history, costing more than $700,000,000—about two-thirds of which is for account of the United States government," Irving S. Olds, chairman, United States Steel Corp., said last week in reviewing accomplishments of the Corporation and subsidiary companies during the first year of the war.

New steel producing or finishing units near Pittsburgh, Chicago, Cleveland, Birmingham, Duluth, Worcester, Mass., Provo, Utah, and on the West coast are being pushed to completion night and day by thousands of workers. Most of these units will go into production during the first half of 1943. A large part of the new facilities is being erected by United States Steel for the account and at the expense of the government. For the remainder, the Corporation is using its own funds.

"The vast steel expansion now being carried on by U. S. Steel and other steel companies in accordance with the wishes of the federal government," Mr. Olds said, "should insure, upon its completion, the supply of steel required for war.

"There must be no relaxation of American industry's all-out war production effort," Mr. Olds added. "The record of U. S. Steel's contribution to the war effort since Pearl Harbor has been most creditable, but we must not be content with past accomplishments. In the days ahead, we must work even harder to attain the steel production needed to win the war."

Reviewing the Corporation's production figures, Mr. Olds stated that more than a thousand new production records have been established since Pearl Harbor by U. S. Steel subsidiaries. As instances of outstanding performances, Mr. Olds cited the delivery of 24 destroyers, two cruisers and many merchant ships, tankers and auxiliary vessels; the invention and production of portable steel runways for airplanes; an accelerated method of spinning bomb casings; completion in four months of 550 miles of pipe for the war emergency oil pipe line; and the production in one week by a single subsidiary of a quantity of steel plates in excess of the amount required for the building of 7000 Gen. Grant tanks. Mr. Olds pointed out that U. S. Steel plants had a larger steel output than all of the units of Germany and Japan combined, on the basis of the latest information available.

New Peak at 30,000 Units

Builders' backlogs still heavy. Continued high operations necessary for duration

MACHINE tool production in the United States during October was approximately 30,000 units, an all-time high. The American armed forces received approximately 22,500 units.

Although dollar value of machine tool production in 1942 will show a 1300 per cent increase over the 1929-1938 yearly average, the backlog of unfilled orders placed by producers of war material now is $1,012,000,000. This represents approximately 7.5 months production by the entire industry.

Although cancellation of machine tool orders occurs as requirements change, a recent survey of existing orders placed by the Army, Navy and Maritime Commission indicated that the percentage of cancellations has been running less than 2 per cent of unfilled orders monthly, a loss which will be exceeded by new orders.

Continuing efforts are being made to assure the most efficient utilization of existing equipment, but the demands of war production cause tools to wear out three times as fast as normally. Depreciation is accelerated by the increased use of untrained operators.

Changes in design of weapons frequently necessitate changes in tools. Similarly, any increase in the strength of armor or the power of projectiles dictates still greater improvement in each. To meet the threat imposed by the German use of flat-trajectory 88 millimeter gun as an antitank weapon, it was necessary to convert a 3-inch high velocity antiaircraft gun into an even better tank destroyer.

Armor and armament on aircraft have been increased far beyond the standards common at the start of the war. The four-bladed propeller, recently announced by the British for use in the Spitfire, soon became standard for fighter planes.

Such changes as these all require new machine tools.

Allowance must also be made for a reserve of critical types of machine tools to replace losses. Total unit requirements for 1943 may be less than for 1942 but more than half of the 1943 production capacity has already been pre-empted by the backlog of unfilled machine tool orders. Machine tool manufacturers are now being urged to make quickest possible deliveries in order that present assembly lines may soon be completed.

Tool Builders' Schedules Will Be Rearranged

Rearrangement of schedules of machine tool manufacturers to spread the work and reduce excessive backlogs of orders, is being undertaken as the No. 1 job of George H. Johnson, new director of the WPB Tools Division.

Mr. Johnson, who assumed the position only recently, was faced with the problem of accelerating the production of machine tools needed for the aircraft program. One expedient move, it was decided, would be to relieve certain companies of orders that could not be filled for many months and to reassign these orders to companies with backlogs of shorter periods.

Examination of the order boards of companies engaged in machine tool production showed that some had backlogs of two years or more, while others had orders for as little as a few weeks. The purpose of the rearrangement of schedules will be to keep the backlogs as nearly even as possible.

SUBCONTRACT PLAN CONCENTRATES RESPONSIBILITY IN ONE ORGANIZATION

Mohawk Valley Plan of subcontracting, giving substantially the same control over subcontracted items that it does over items being made within the contractor's plant, has been developed by Lamson Corp., Syracuse, N. Y.

Under the plan, each group of subcontractors in a zone is covered by inspectors and expediters whose only responsibility is that particular group. The size of the group under one inspector or expediter depends on the geographical location of the subcontractors and the amount of work subcontracted.

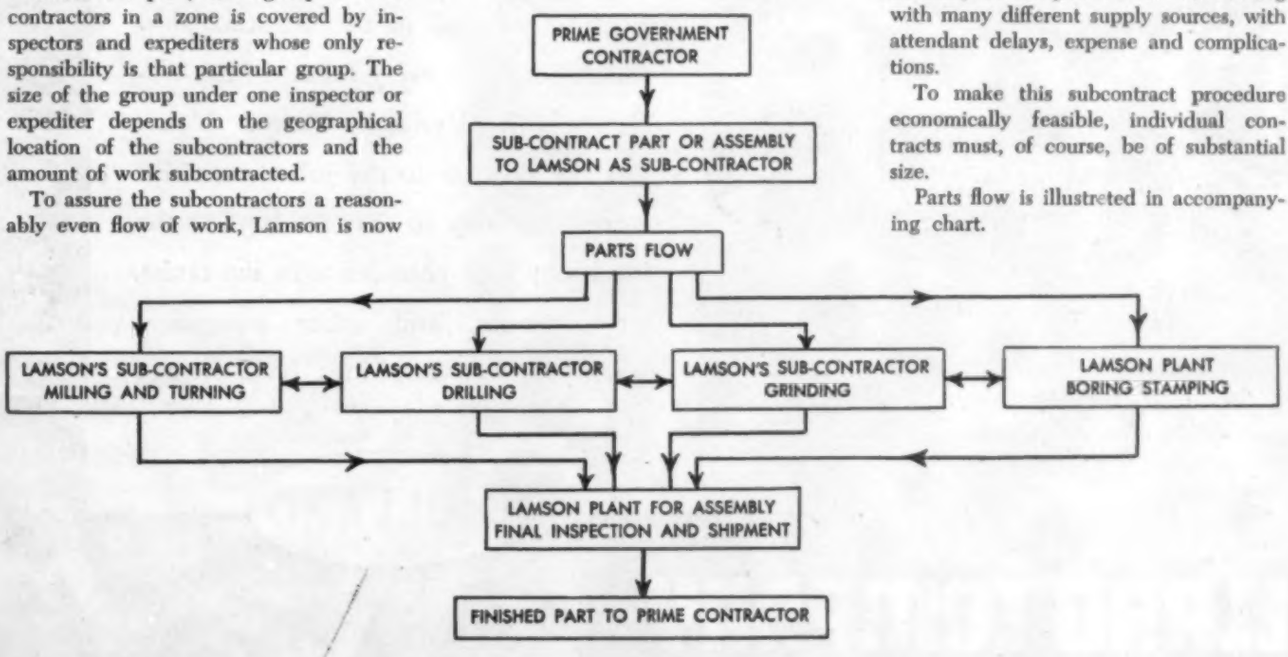
To assure the subcontractors a reasonably even flow of work, Lamson is now taking subcontract orders from other manufacturers holding prime government contracts and giving portions of the work to its subcontracting groups.

Lamson does all expediting and engineering, thus giving its principal the advantage of a multiplicity of tool facilities, but, at the same time, keeping the overall responsibility concentrated in the hands of one organization.

Not only does this give undivided responsibility, but it also eliminates the necessity for the prime contractor dealing with many different supply sources, with attendant delays, expense and complications.

To make this subcontract procedure economically feasible, individual contracts must, of course, be of substantial size.

Parts flow is illustrated in accompanying chart.


PRIME GOVERNMENT CONTRACTOR
SUB-CONTRACT PART OR ASSEMBLY TO LAMSON AS SUB-CONTRACTOR
PARTS FLOW
LAMSON'S SUB-CONTRACTOR MILLING AND TURNING
LAMSON'S SUB-CONTRACTOR DRILLING
LAMSON'S SUB-CONTRACTOR GRINDING
LAMSON PLANT BORING STAMPING
LAMSON PLANT FOR ASSEMBLY FINAL INSPECTION AND SHIPMENT
FINISHED PART TO PRIME CONTRACTOR

The Army-Navy "E" for excellence means to the Bullard workers that they are Industrial Soldiers backing up the Armed Forces—those Soldiers at the front.

Such a spirit of true Americanism reflects itself not only in speeded-up Production but also in the workmanship which goes into every Bullard Mult-Au-Matic and Vertical Turret Lathe. They're built to do the jobs faster and more accurately so that the boys at the front may have confidence in the tanks, guns, planes, and other equipment which Bullard machines have helped to build.

BULLARD

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BRIDGEPORT, CONNECTICUT

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Studebaker Corp. receives share of plaudits for turning out $215,000,000 worth of war products in 1942. Triples original aircraft engine schedule

SOUTH BEND, IND.

WHILE Detroit is frequently referred to as the arsenal of democracy, "Detroit" actually is more a state of mind than a geographical restriction of democracy's arsenal to a single city. Other ex-automotive centers, such as South Bend, often show excusable irritation over the apparent exclusion of their efforts in war production which, after all, are not inconsiderable.

Studebaker Corp. of South Bend, for example, will turn out $215,000,000 worth of war products this year, and is heading for a total of $350,000,000 next year. The company now is at work on ten separate war contracts, all restricted items except military trucks and airplane engines—and until last week the latter was also a "hush" item despite the fact it will soon be two years since the company received its first contract for engines.

Though these figures may seem small compared to some of the multi-million dollar war contracts scattered around the country these days, it must be remembered Studebaker in an automotive sense is a relatively small company, peak peacetime employment not being much over 10,000. Today 16,000 are at work in Studebaker plants at South Bend, Chicago and Fort Wayne, plants in the latter cities being new feeder units for the new engine operation at South Bend.

Studebaker is an old company and is an old hand at war goods manufacturing, having supplied materiel of one sort or another in every war this country has engaged in since 1852. But in the 67 years of the old Studebaker Bros. company, from 1852 to 1919, the entire volume of war production totaled only about 100 millions.

Engine Program on Heroic Scale

The most sensational and heroic undertaking of the moment is the airplane engine program, in which the unceasing co-operative efforts of Studebaker and Wright Aeronautical Corp. resulted in beating earlier production schedules by four months. Breaking ground for new plants in March of 1941, the first engines were shipped just a year later and output has expanded rapidly every month since then.

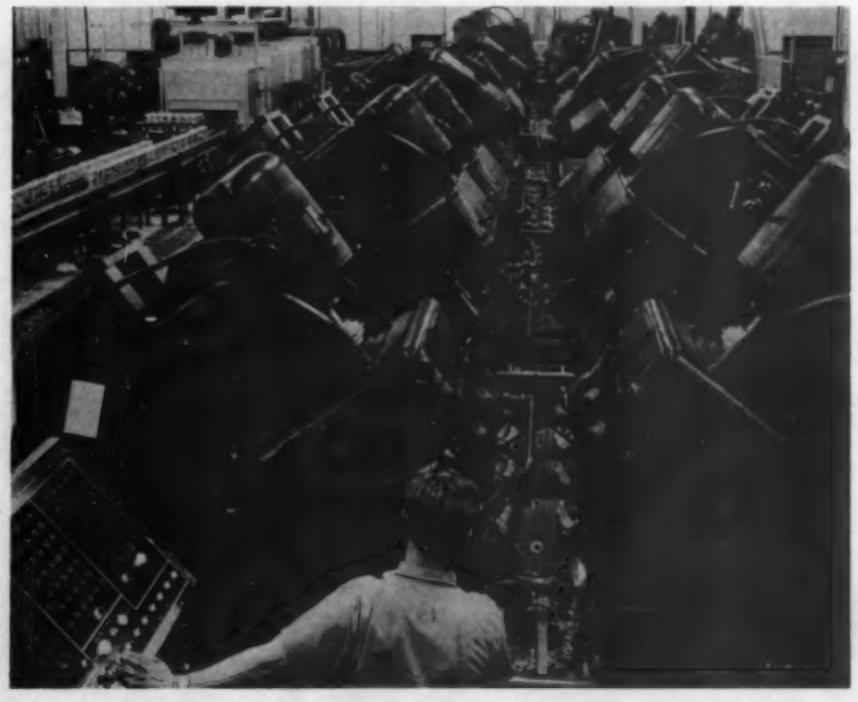
Engine being built by Studebaker is the Wright R1820 nine-cylinder radial, rated at 1200 horsepower at 2500 r.p.m., the latest version of a long series of Cyclone models which were first used in commercial air liners over ten years ago. This power plant is not the one which Studebaker once planned to build; in fact five months of preliminary planning and tooling for a 14-cylinder engine were thrown out the window in June, 1941, when the Army Air Forces decided to concentrate on production of the Boeing B-17 Flying Fortress at a greatly accelerated pace and thus was confronted with the danger of an engine shortage. Thanks to the sales ability of Lieut.-Gen. W. S. Knudsen and his faith in Studebaker, it was finally agreed that Studebaker and Wright should cooperate in bulwarking supplies of the Fortress engines. They have made good in a superior way, though there has been little fanfare over the achievement, and each participant is convinced it would have been impossible without major assistance from the other.

Project Enlarged 3½ Times

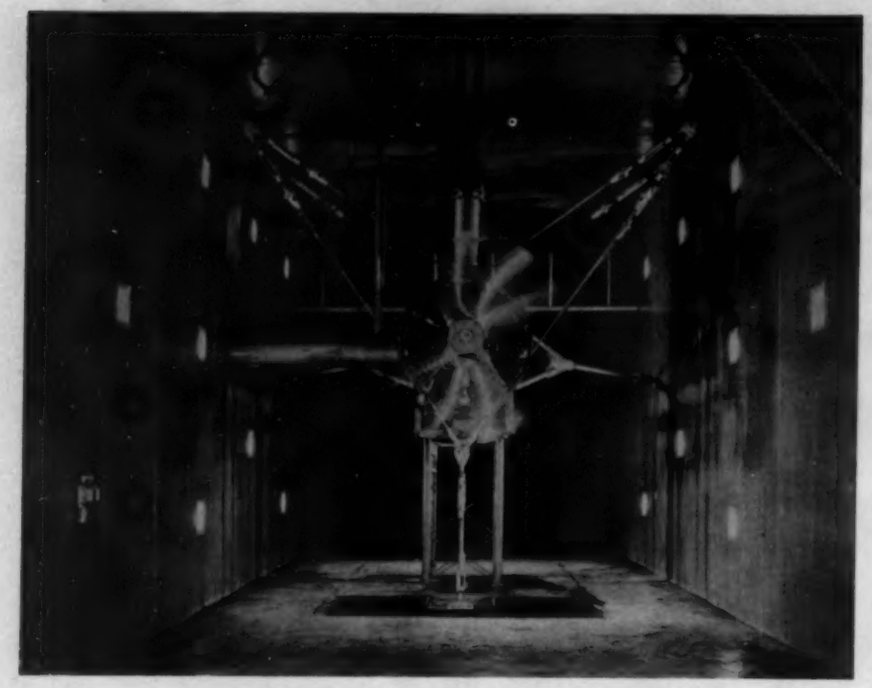
Original production program, doubled after Pearl Harbor, now is virtually 3½ times the size of the project when it was first launched two years ago, and while peak output has not yet been reached, it is at least half-way toward the proposed goal. Plant facilities have been underwritten by the DPC to an extent of over $70,000,000, latest increase being for $6,500,000, announced Oct. 15.

Spotting of three plants in separate localities to produce a single type of engine may sound incongruous in these days of vast plant areas under a single roof, but when related to the availability of labor supply, Studebaker's wisdom seems perfectly sound. To locate the three plants at a common point would cause disruptions in the community which are now evident in nearly every large industrial section. Placing the principal plant on the home lot permitted Studebaker gradually to move its automotive workmen over to aircraft engine operations and to step up the latter steadily without hardship on local labor. The South Bend plant comprises about 50 per cent of the floor space of the three units, requires 40 per cent of total employment. Only now is the bottom of the barrel of available labor being scraped, and employment of women can still go much further. At present women comprise only 12 per cent of the total at South Bend, 20 per cent at Chicago and 14 per cent at Fort Wayne. By the end of November, Studebaker had lost 1000 men to the armed services.

In laying out production equipment, the company naturally has been guided by the experience of Wright. For one thing, Studebaker had only a small staff



One of a battery of three Greenlee automatics for machining cast aluminum cylinder heads at Studebaker plant. Heads are bolted to plates and move down central ways, being locked in position as cutting heads follow through cycle



Mounted on test stand in one of 96 concrete U-type cells, the 1200-horsepower engine whirls its "club" propeller as observers watch through window in left wall. Fire protection is maintained by carbon dioxide spray, released through nozzles, two of which are shown in roof

of technicians to handle the job; that is, compared with some of the larger motor companies. Furthermore, the machining, finishing, assembling and testing of an aircraft engine are as different as night from day compared with automotive practice.

The project was under the general direction of H. S. Vance, who returned to his company after spending some time with the former OPM where he worked closely with Knudsen. Heading up work on shop detail and equipment was Ralph Vail, whose working knowledge of machining practice and intimate association with "the machine tool people" are surpassed by few in the automotive industry. Mr. Vail has been in the automobile "game", as he says, since 1904, and during the height of the career of the late Dodge brothers, he became one of their right-hand men as far as manufacturing practice was concerned. Since that time he has been a pioneer in guiding Studebaker production and is now vice president in charge of that department—but his manner is that of anybody save a vice president.

Two of these wheeled tables hold the 8000 parts making up one Wright engine as it is torn down for inspection after the "green" test run. Note forged steel crankcase sections on lower shelf of table at left

Learned to Spend Money

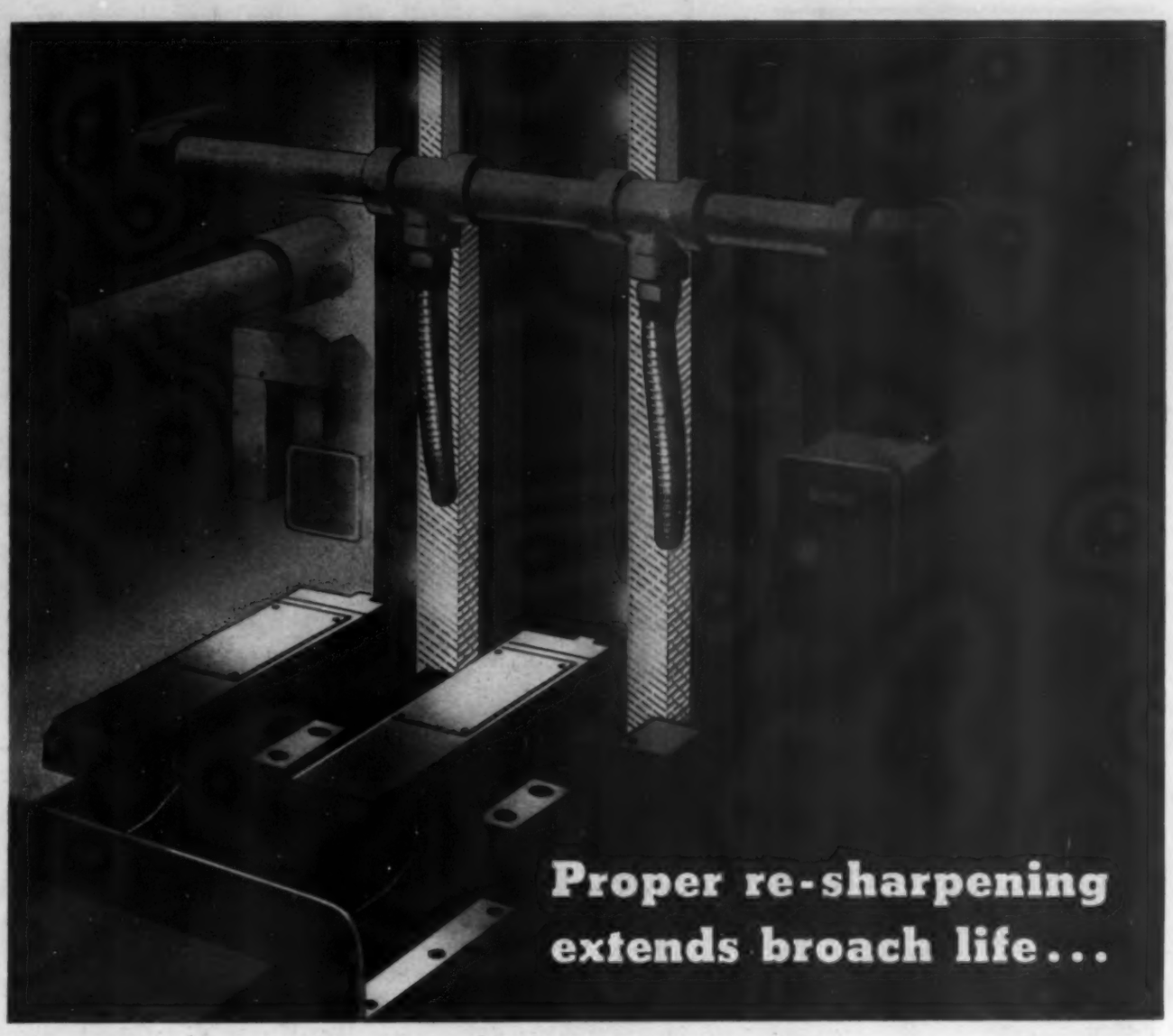
When asked what he has learned from his two-year association with aircraft engine manufacturing, Mr. Vail replies bluntly, "I've learned how to spend a hell of a lot of money!"

However, money alone will not build an engine that will stand the gaff and build them in thousand-lots. Dependable suppliers and subcontractors (Studebaker subcontracts about 58 per cent of the Wright engine job), precision equipment and tooling, trained personnel and inspectors (Vail says women make better machine operators than men when "trained from scratch", that is, without previous skill) are requisites.

Consider the forged alloy steel crankcase on which the Wright engine is built. Starting with two forgings weighing 178 pounds apiece, they are hogged out, faced, bored, drilled, tapped and ground down to a two-piece unit weighing but 78 pounds, with vertical wall thickness of but 0.010-inch. That represents removal of 278 pounds of steel or nearly 80 per cent of the original forgings. There is no real reason for having to cut away so much of the original steel, except that it has proved impossible to forge the section in anything but its hefty form. However, it takes a lot of intricate machining to finish these basic pieces.

One of the most elaborate and complete setups for facing, drilling, boring, reaming, tapping and counterboring aluminum cylinder heads ever achieved is that which Studebaker-Wright engineers have installed at South Bend, working in co-operation with Greenlee Bros. & Co., Rockford, Ill. Greenlee automatics now are in use in other Wright airplane engine plants and their spectacular appearance never fails to stop an inspection party. Actually what they are is a series of massive tool heads angularly

(*Please turn to Page* 148)



Information supplied by an Industrial publication

Proper re-sharpening of broaches is a very important factor in their continued performance. Tooth form, cutting hook and finish should conform as closely as possible to the original after re-sharpening.

There are two particular ways of determining when a broach should be re-sharpened. One consists of periodic examination of the finished work. The other, and more accurate, is examination of the broach itself.

If the work starts to show rough surfaces, or tears, it is a good indication that the broach is in need of re-sharpening. But this method of checking is not recommended.

The best way is to examine the cutting edge of the broach teeth at regular intervals. When there is a shiny land on the tooth, or the edge is ragged, the broach should be sharpened.

The land should not be allowed to become too wide, because if it does, too much stock must be removed in re-sharpening. It is much better to re-sharpen oftener and thus extend the life of the broach.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
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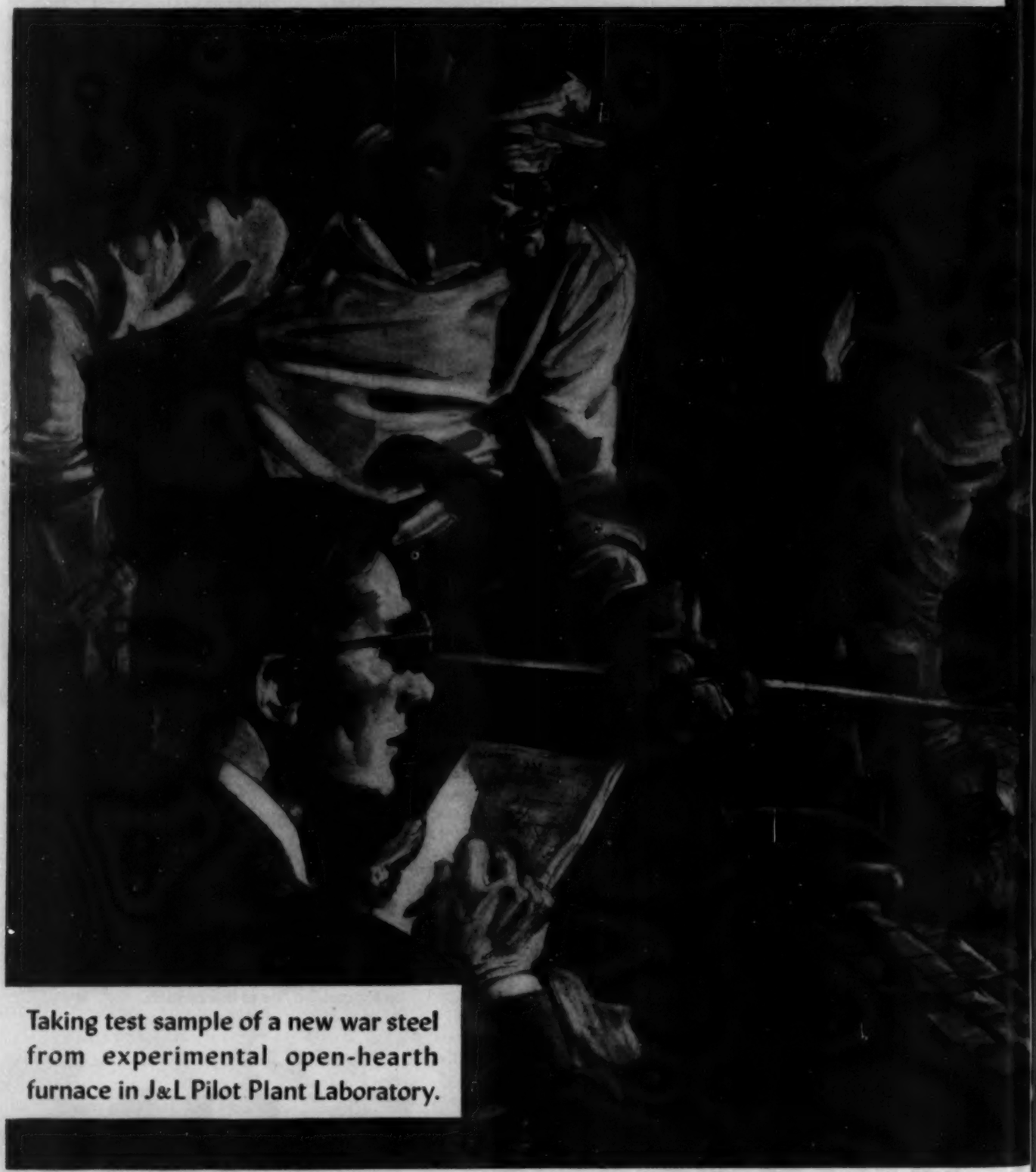
MOLY

TO CRUSH ENEMY FORCES, SAFEGUARD OUR OWN, IS AIM OF STEEL RESEARCH



Taking test sample of a new war steel from experimental open-hearth furnace in J&L Pilot Plant Laboratory.

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FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL

HUSH-HUSH IN WAR LABS

Censorship and secrecy are rigidly imposed in American industrial laboratories because of startling results in research on new materials and weapons to crush enemy forces, and protect our own, achieved during our first year at war. "Sections of many industrial laboratories are so hush-hush," says Scripps-Howard's *Washington Calling* "even important officials can't get near them. Top war men are cheered by some new offensive weapons you won't hear about for some time."

Steel research had momentum when war came, was able to swing immediately into war-steel development work. Research facilities were available in hundreds of plants. Thousands of trained metallurgists, chemists and skilled research workers had an accumulation of data on the innermost secrets of steel; were eager to put their knowledge to work to help fight the war.

Pilot for peace is now pilot for war thanks to foresight of J&L metallurgists and management who in 1937 took steel research out of the test tube stage, put it on a practical basis in first Pilot Plant laboratory in the industry. Here with small experimental furnaces and rolling mills, research engineers conduct their experiments under conditions that simulate actual mill practice without interfering with mill operations — make it possible for their findings to be quickly applied to the big steel producing furnaces and mills.

Small four-ton open-hearth furnace (capacity each regular steel works furnace averages 150 tons) is keystone of this unique laboratory where practical steel men, technically-trained metallurgists and physicists work 24 hours a day. Since December 7, 1941 this little furnace and its crew have been developing new steels with which to destroy the Axis and protect the lives of our sons, our husbands, our fathers, our brothers in the armed forces.

Skilled steel workers in the J&L plants eagerly take over new developments of the Pilot Plant and apply them to producing new war steels—millions of tons a year. Working shoulder to shoulder with mill metallurgists are men whose fathers and their fathers before them for a century have been the backbone of steelmaking in America. Month after month these men establish new production highs, make world records, then break them again and again.

Axis feeling effects of U. S. research. Today enemy forces on land, at sea and in the air are feeling the destructive effects of our armed forces equipped with the products of American ingenuity in making materials of war, with more to come. At the same time our fighting men are getting a tremendous lift from the security of bombers that return safely, of tanks that aren't pierced, of ships that won't go down.

New List of Areas with Manpower Shortages Issued by WMC Chairman

A NEW list of 270 industrial areas, showing that current labor shortages exist in 102 areas, are anticipated in 77 others, and that labor surpluses are current in 91, has been prepared by the War Manpower Commission.

The lists are furnished to the War Production Board and government procurement agencies for guidance in placing war contracts with consideration for manpower factors, and are revised periodically.

The list of 270 areas is the first revision announced since the original list of 227 areas was issued Oct. 20. With the addition of 43 new areas, the list now includes all cities of 50,000 or more population, and any smaller cities where 5000 or more workers must be added to the local labor force to meet peak production demands.

"Manpower is only one of several considerations that guide procurement officials in negotiating war procurement contracts," WMC Commissioner McNutt explained. "The ability of a concern to deliver or perform a contract on time, and the ability of a concern to fill a contract with a minimum amount of new machinery or equipment, and other factors are likewise considered.

"The lists represent a positive approach to the need for placing war contracts in areas in which workers would otherwise be idle, underemployed, or employed in producing materials that are less essential to the war effort. Experience since the original list of cities was issued indicates that war contracts will tend to flow to manufacturers in labor surplus areas.

Exhaust Local Supply First

"Any community that has a labor shortage at present, or is facing an anticipated labor shortage, should lose no time in drawing upon its own labor reserves to relieve the shortage. Only by utilizing every possible source of untapped local labor—for example, women, handicapped workers, and minority groups—can a community classified as a labor shortage area be confident of discharging the war production commitments."

The chairman pointed out that the grouping of localities may be changed from time to time. "We are ready to change our recommendations as to the placing of contracts," he said, "if an area solves its labor shortage problem. These solutions depend, of course, on the extent of local initiative and co-operation with the program of the War Manpower Commission. We have asked industry, labor and civic organizations to do their part in a program of voluntary co-operation to correct labor piracy, hoarding, discriminatory hiring, and other hindrances to the full use of manpower."

Mr. McNutt explained that continuous surveys of labor conditions throughout the country provide the basis for forecasts of labor shortage conditions in the future. "Employers have told us," he said, "how many workers they will need in the future, as well as right now. We know how many more will leave their jobs for military service, and how many will have to be replaced. Some communities have had an adequate labor supply so far, and may have enough workers now. However, it may be advisable not to ask these communities to undertake more work if that work can be done somewhere else, due to inevitable manpower shortages in the future."

In many communities, workers have had no opportunity to participate or contribute their skill to the war production effort, he said. "In most of these areas where labor is abundant," he added, "housing, transportation, and other facilities are also plentiful."

War Manpower Chief Paul V. McNutt considers the entire population "a national pool from which the needs of the armed forces, industry, agriculture and essential civilian activities will be supplied." Above, the manpower czar is shown at a recent press conference at which he announced plans to ration scarce labor. NEA photo

Report Lost Time Due to Strikes at Five-Year Low

Office of War Information last week released a chart based on National War Labor Board figures showing that man-days of idleness due to strikes in all industry have dropped, during a year of war, to the lowest level of the past five years.

While the number of men employed in industry has risen from a monthly average of 30,545,000 in 1937 to 36,621,000 for the first ten months of 1942, the average number of man-days of idleness due to strikes has fallen in that period from 2,369,000 to 397,000. Man-days of idleness for the first ten months of this year are only 28 per cent of the average for the last five years of peace, though monthly employment in 1942 was up 119 per cent of the five-year average.

The percentage of time lost in war industry strikes since Pearl Harbor has never risen above one-tenth of one per cent of the number of man-days worked.

Man-Days Idle—Strikes In All Industry

	Total	Average per month
1937	28,424,857	2,368,738
1938	9,148,273	762,356
1939	17,812,219	1,484,352
1940	6,700,872	558,406
1941	23,047,556	1,753,963
1942	(ten months)	396,888

Jan.	327,206	Feb.	351,947
Mar.	397,477	Apr.	360,382
May	306,964	June	550,000
July	450,000	Aug.	450,000
Sept.	450,000	Oct.	325,000

Steelworkers Earn 13% More Per Ton

Wage increase and additional overtime responsible for advance over a year ago

STEEL companies are paying employes 13 per cent more in direct wages per ton of products turned out by the employes than they did a year ago, according to the American Iron and Steel Institute.

In September this year, the wage earners were paid an average of $16.71 for every ton of pig iron and steel products shipped to consumers, compared with $14.72 in September, 1941. Prices at which iron and steel products are sold remained unchanged over the period.

The wage increase effective last summer, and more overtime pay, "are responsible for most of the rise in labor cost per ton," the institute states.

Rise in average hourly earnings was somewhat less than increase in wage per ton, indicating a slight decrease in output per man-hour.

Payrolls totaling a record-breaking $126,627,000 were distributed by companies in the steel industry in October. The total exceeded by nearly $2,000,000 the previous peak of $124,777,000 disbursed in September. In October, 1941, steel payrolls set a new peak up to that time of $118,890,000.

Continuing the trend of the past several months, the number employed in the industry declined during the month, with 635,000 employes on the rolls during October, against 640,000 in September, and 646,000 in October, a year ago.

Wage-earning employes earned an average of 107.7 cents per hour in October, compared with 108.6 cents per hour in September and 98.3 cents per hour in October, 1941. An average of 39.9 hours per week was worked by wage earners in the month, against 39.8 hours per week in September, and 40.9 hours per week in like month last year.

Monthly payrolls and employment since the first of the year are shown in the following table:

	Payrolls	Number of Employes
January	$118,785,000	651,000
February	108,563,000	651,000
March	116,998,000	653,000
April	118,568,000	654,000
May	117,403,000	656,000
June	118,067,000	659,000
July	120,671,000	665,000
August	118,718,000	647,000
September	124,777,000	641,000
October	126,627,000	635,000

MEN WANTED

General Workers Needed Immediately

No Special Skill or Experience Required

ALSO MANY POSITIONS OPEN FOR SKILLED WORKERS

Applications from men already engaged in War production cannot be considered

BETHLEHEM STEEL COMPANY
LACKAWANNA PLANT

Apply at Employment Office, 1915 Hamburg Turnpike, Lackawanna

Manpower Shortage Causes Finishing Operations To Fall

Shortage of manpower has curtailed operations in steel mill rolling departments in the Buffalo district. Bethlehem Steel Co., last week placed a quarter-page display advertisement for help in Buffalo newspapers. Many foundries are placing similar ads. However, response has been negligible.

The heavy industries have difficulty competing with aviation plants and other war industries for the limited supply of labor available. Mills report a considerable number of workers have found ways of evading antipirating labor agreement among Buffalo industries, by taking jobs elsewhere.

Steel mills have jobs available "for thousands of workers." While the labor shortage has not been reflected in ingot production, finishing departments have been curtailed. Ingots have been stored in one plant, awaiting a satisfactory arrangement of schedules in rolling mills.

President Asks Seniority Rights for War Workers

Request that employers in civilian industries grant the same seniority guarantees and re-employment advantages to workers who leave to accept jobs in war plants as are offered to employes who leave for the armed services was issued last week by the President.

Selective Service act provides both retention of seniority and replacement in their old or comparable jobs.

WRITES SLOGAN, WINS BOND

SLOGAN contest winner W. C. Knake received a $25 War Bond from an Indiana plant of General Electric Co., for his "Scrap's a Spy, He's Gotta Die" entry. Contest was conducted as part of G-E's program to reduce waste and spoilage. The slogan is being prominently displayed on posters during the bond campaign and in the plant's employe magazine

Accumulated Shortages To Make Possible Post-War Prosperity Era

NEW YORK

THE stage is set for an economy of prosperity after the war, provided a number of vitally important things are done. The primary necessity is to reform those national policies that now depress business and discourage investment of private funds in business ventures. That was the main conclusion reached in a panel discussion before the War Congress of American Industry, held recently in New York under auspices of the National Association of Manufacturers.

Dr. Ralph Robey, associate editor, *Newsweek*, prophesied that by the end of 1943 the American public will have the greatest accumulation of buying power in its history. The principal element will be $24,000,000,000 of war bonds held by individuals, all immediately convertible into cash on demand. He estimated that at the same time there will have accumulated a reservoir of installment credit amounting to at least $8,000,000,000. In addition, there will be some $18,000,000,000 of cash in circulation and some $116,000,000,000 of deposits in our commercial banks. Obviously, he argued, there will be no need for governmental pump priming.

There will be accumulated shortages of almost all types of consumers' durable goods, Dr. Robey said, shortages that will come to almost $12,000,000,000. For business construction and equipment, he predicted a shortage of another $3,000,000,000; for deferred maintenance, another $2,800,000,000; for public works and maintenance, $2,600,000,000; and for consumers' nondurable goods, $2,500,000,000—a total exceeding $22,500,000,000.

Government Holds the Key

By December of 1943, he believed, there will be a deferred demand for 10,000,000 automobiles, 1,000,000 houses, 20,000,000 radios. On the other hand, we will have an expanded supply of all raw materials, of machine tools, electric energy and trained workers. The world will look to us for manufactured goods of all kinds. There is not the slightest doubt but what we can have prosperity, he declared, but added that whether we have it depends on what the government does with reference to taxes, the banking system, labor, agriculture, and so on.

Dr. Harley L. Lutz, professor of public finance, Princeton University, Princeton, N. J., expressed the opinion that there can be no vigorous recovery of the free enterprise system in the postwar period without a remarkable relaxation of progressive taxes. It is equally clear, he believed, that the enemies of a free society are fully aware of the advantage they now hold, with these taxes, and that they will resort to every kind of trick, stratagem and artifice to prevent such relaxation. He thinks the postwar period also is far from attractive to the investor in another respect—the security of the monetary unit. When it is necessary to make adjustment for an unknown but possibly violent change in the dollar, the investment process is demoralized or even paralyzed.

Other pertinent comments about the postwar period were as follows:

Prof. Ray Westerfield, Yale University: The banks may hold close to $100,000,000,000 of government bonds before the war is over, a bad condition because it will place the banks largely under the control of the Treasury Department. Some demagogue is likely to come along and say "Why pay all this interest to the banks?" and then propose socializing the banking system. . . . Existing obstacles to private investment will have to be overcome to finance the postwar period.

Need Lower Taxes

Murray Shields, economist, Irving Trust Co., New York: Postwar business must be expanded by lowering taxes, by encouraging the profit motive, by the elimination of many existing governmental controls. The government must confine its expenditures to public works only, public works for use and not for work relief or other ulterior purposes.

H. B. Arthur, economist, Swift & Co.: The fact that business men now are thinking in terms of improving the lot of our underprivileged citizens should make the public feel in the course of time that this is decreasing in stature as a government problem. . . . Every employe should be informed about the lengths to which employers have to go every day in complying with government regulations; they already are resentful of controls which affect their lives and which many of them believe to be unjust and unnecessary. It should be easy to develop a resentment that will bring eventual elimination or sharp modification of burdensome government controls.

Proposal of the War Production Board to further zone and concentrate industries was questioned by the congress, and a formal resolution protesting against needless action of this kind was adopted.

The situation was analyzed by NAM's chairman, Walter D. Fuller, president, Curtis Publishing Co., in a radio broadcast.

"New York fur makers are told blandly by a deputy chairman of the War Manpower Commission whom I quote, 'You are going to bleed to death . . . Your men will be taken out bit by bit'. New York City now has several hundred thousand unemployed. Many of those unemployed do similar work, have similar skills to those of fur workers. Yet there is talk of bleeding such business to death. What for?" asked Mr. Fuller.

"Sacrifice End in Itself?"

"There seems to be a conviction among some of our administrators that sacrifice is an end in itself, that mortification of the flesh will win the war," he continued. "If concentration of industry is necessary for victory, you and I certainly will not oppose it. But we want to be certain that it is necessary. For concentration with all that it entails for industry, for labor, for our whole economy, can be achieved only at a heavy price."

In reporting on the activities of his Office of Price Administration—referring to it as "Other People Associated"—Leon Henderson said that we are in for more red tape instead of less as long as the war lasts. Rationing will have to be applied to additional commodities.

Henry J. Kaiser, Pacific coast shipbuilder and potential iron and steel producer, submitted an outstanding address on "Management's Responsibility in the Postwar World". He called upon industry to plan now on how to provide work for all after the present emergency is over. Housing, road construction, all sorts of consumer and industrial goods will afford opportunity on a vast scale and if industrial managements will plan realistically and unselfishly they will lead the way to a high postwar level of prosperity.

Resolutions that were passed requested remedial action to resolve inequities in the 1942 tax law and the contract renegotiation act, decried recent attacks on the American patent system, called for a plan for postwar close relationship between industry in the United States and industry in the United Nations, urged centralization and stabilization of food control under one head, lauded the National Educational Association for its educational activities.

The congress adopted a 1943 platform calling for all-out victory and op-

position to anybody who gets in the way. Read by NAM's new president, Frederick Coolidge Crawford, it declared industry stands for the basic American freedoms and will do everything it can to preserve these freedoms while at the same time pledging all its skill and resourcefulness in producing for victory. It also pledged industry to turn its skill and resourcefulness to the works of peace, to provide employment for returning soldiers and sailors and all others, "to enable the American people to resume their historic upward march, spiritually and materially as free men."

Officers, Directors Elected by Manufacturers

Frederick C. Crawford, Cleveland, was elected president of the association. Mr. Crawford, who is president of Thompson Products Inc. and Thompson Aircraft Products Co., will take office Jan. 1.

Directors-at-large for the years 1943-44 were named as follows:

C. S. Davis, president, Borg-Warner Corp., Chicago; J. Howard Pew, president, Sun Oil Co., Philadelphia; James H. Rand Jr., president, Remington Rand Inc., New York; Ernest T. Weir, chairman of the board, National Steel Corp., Pittsburgh; Robert E. Wood, chairman of the board, Sears, Roebuck & Co., Chicago; R. J. Wysor, president, Republic Steel Corp., Cleveland.

State directors include:

ALABAMA: Herbert C. Stockham, president, Stockham Pipe Fittings Co., Birmingham.

CALIFORNIA: Alfred W. Eames, president, California Packing Corp., San Francisco; J. A. Hartley, president, Braun Corp., Los Angeles; K. T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles.

COLORADO, UTAH, NEW MEXICO and ARIZONA: Harold F. Silver, president, Silver engineering Works Inc., Denver.

CONNECTICUT: Graham H. Anthony, president, Veeder-Root Inc., Hartford; N. W. Pickering, president, Farrel-Birmingham Co. Inc., Ansonia; Maurice Stanley, president, Fafnir Bearing Co., New Britain.

DELAWARE: Lammot du Pont, chairman of the board, E. I. du Pont de Nemours & Co. Inc., Wilmington.

GEORGIA: Wm. D. Anderson, chairman of the board, Bibb Mfg. Co., Macon.

ILLINOIS: James D. Cunningham, president, Republic Flow Meters Co., Chicago; Robert M. Gaylord, president, Ingersoll milling Machine Co., Rockford; Wilfred Sykes, president, Inland Steel Co., Chicago.

INDIANA: Wm. A. Atkins, vice president, E. C. Atkins & Co., Indianapolis; Louis Ruthenberg, president, Servel, Inc., Evansville; Lothair Teetor, president, Perfect Circle Co., Hagerstown.

IOWA: George M. Foster, vice president, John Morrell & Co., Ottumwa.

KANSAS: H. W. Cardwell, president, Cardwell Mfg. Co. Inc., Wichita

KENTUCKY: A. H. Dick, president, Louisville Textiles Inc., Louisville.

LOUISIANA: John U. Barr, proprietor, Federal Fibre Mills, New Orleans.

MAINE and VERMONT: Redfield Proctor, president, Vermont Marble Co., Proctor.

MARYLAND: S. Duncan Black, president, Black & Decker Mfg. Co., Towson.

MASSACHUSETTS: G. N. Jeppson, president, Norton Co., Worcester; William M. Rand, vice-president, Monsanto Chemical Co., Merrimac Division, Everett; George B. Wells, president, American Optical Co., Southbridge.

MICHIGAN: G. W. Mason, president, Nash-Kelvinator Corp., Detroit; Clarence J. Reese, president, Continental Motors Corp., Muskegon; S. Wells Utley, president, Detroit Steel Castings Co., Detroit.

MINNESOTA: M. W. Griggs, president, Griggs, Cooper & Co., St. Paul; S. V. Wood, president, Minneapolis Electric Steel Castings Co., Minneapolis.

MISSOURI: M. G. Ensinger, president, Union Wire Rope Corp., Kansas City; Byron A. Gray, president, International Shoe Co., St. Louis; Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis.

NEBRASKA: L. E. Hurtz, president, Fairmont Creamery Co., Omaha.

NEW HAMPSHIRE: Winthrop L. Carter, president, Nashua Gummed & Coated Paper Co., Nashua.

NEW JERSEY: Thomas Roy Jones, president, American Type Founders, Inc., Elizabeth; Robert Shannon, president, RCA Mfg. Co. Inc., Camden; E. F. Weston, president, Weston Electrical Instrument Co., Newark.

NEW YORK: W. M. Angle, president, Stromberg-Carlson Telephone Mfg. Co., Rochester; C. Donald Dallas, president, Revere Copper & Brass Inc., New York City; Theodore G. Montague, president, Borden Co., New York City.

NORTH CAROLINA: Stuart W. Cramer Jr., president, Cramerton Mills Inc., Cramerton; Reuben B. Robertson, executive vice-president, Champion Paper & Fibre Co., Canton.

OHIO: Harold Boeschenstein, president, Owens-Corning Fibreglass Corp., Toledo; Roger A. Selby, president, Selby Shoe Co., Portsmouth; C. J. Stilwell, president, Warner & Swasey Co., Cleveland.

OKLAHOMA: Howard Stover, secretary and treasurer, Gaso Pump & Burner Mfg. Co., Tulsa.

OREGON: T. H. Banfield, president, Iron Fireman Mfg. Co., Portland.

PENNSYLVANIA: Charles E. Brinley, president, Baldwin Locomotive Works, Philadelphia; A. W. Robertson, chairman of board, Westinghouse Electric & Mfg. Co., East Pittsburgh; Wilbert Wear, president, Harrisburg Steel Co., Harrisburg.

RHODE ISLAND: Norman D. Mac Leod, president, Abrasive Machine Tool Co., East Providence.

SOUTH CAROLINA: J. L. Coker, president, Sonoco Products Co., Hartsville.

TENNESSEE: A. J. Dyer, president, Nashville Bridge Co., Nashville.

TEXAS: J. B. O'Hara, president, Dr. Pepper Co., Dallas; John R. Suman, vice president, Humble Oil & Refining Co., Houston.

VIRGINIA: E. H. Lane, president, Lane Co. Inc., Altavista.

WASHINGTON: E. I. Garrett, president, Wire Rope Mfg. & Equipment Co., Seattle; E. G. Griggs II, president, St. Paul & Tacoma Lumber Co., Tacoma.

WEST VIRGINIA: J. A. Bloch, president, Bloch Brothers Tobacco Co., Wheeling.

WISCONSIN: Walter Geist, president, Allis-Chalmers Mfg. Co., Milwaukee; Herbert V. Kohler, president, Kohler Co., Kohler; C. O. Wanvig, president, Globe-Union Inc., Milwaukee.

Continuing as members of the 1943 board of directors are:

William P. Witherow, president, Blaw-Knox Co., Pittsburgh; Howard Coonley, chairman of board, Walworth Co. Inc., New York; Walter D. Fuller, president, Curtis Publishing Co., Philadelphia; Charles R. Hook, president, American Rolling Mill Co., Middletown, O.; H. W. Prentis Jr., president, Armstrong Cork Co., Lancaster, Pa.; William B. Warner, president, McCall Corp., New York; Henry Abbott, president, Calculagraph Co., New York; C. M. Chester, chairman of board, General Foods Corp., New York; H. L. Derby, president, American Cyanamid & Chemical Corp., New York; Robert L. Lund, executive vice president, Lambert Pharmacal Co., St. Louis; S. Bayard Colgate, chairman of board, Colgate-Palmolive-Peet Co., Jersey City; Thomas J. Hargrave, president, Eastman Kodak Co., Rochester; John Holmes, president, Swift & Co., Chicago; Sydney G. McAllister, chairman executive committee, International Harvester Co., Chicago; Malcolm Muir, president, Newsweek, New York; W. S. S. Rodgers, president, Texas Co., New York.

Shown at the War Congress of American Industry, New York, are, left to right: Henry J. Kaiser, Pacific Coast shipbuilder; William P. Witherow, retiring president of the National Association of Manufacturers; and Frederick C. Crawford, new president of the association. NEA photo

Management Society Discusses Wartime Production, Cost Problems

PROBLEMS confronting industrial management growing out of war production, distribution and government controls, involving costs, operating schedules, training and labor relations were discussed at the annual conference of the Society for the Advancement of Management, New York, Dec. 3-5.

That management must accept increasing responsibilities was the keynote of numerous statements by leaders in industry, economics and organized labor. Labor leaders took a more prominent part in the meeting than they did in previous years, without exception urging closer co-operation between management and labor.

Percy S. Brown, president, Consumer Distribution Corp., New York, was elected president of the section. R. R. Zimmerman, executive assistant to the chairman, Council for Personnel Administration, Washington, is new vice president; Herbert E. Stats, division of administrative engineering, State of Minnesota, secretary; and Frank G. Atkinson, works manager, Joseph Dixon Crucible Co., Jersey City, treasurer.

New approach to cost controls is required by new and frequently changing production problems, George Ebert, comptroller, propeller division, Curtiss-Wright Corp., Caldwell, N. J., declared. He pointed out that methods of obtaining costs and presenting of cost facts to management are frequently overlooked as an aid in obtaining increased output. Statistics on costs properly presented soon enough are valuable aids to management, often centering attention to items which are potential bottlenecks and users of excess manpower. But because of the speed at which industry is operating, unless this information is available at once, much of its value is lost.

Scrap Losses Reduced

Quick decisions on production schedules and detailed information as to costs, inventory, production and profit, allow prompt revisions.

Citing as an example, heavy scrap losses, up to 40 per cent in the fabrication of a certain propeller blade, Mr. Ebert described a cost and time study of the task. Method of fabrication was improved by new equipment, changes in material and process of fabrication. Personnel was trained for the new methods and scrap losses were cut 10 per cent, but improvement did not continue.

Cost study determined the fact scrap losses were less on the first shift of employes than on the second and third. Supervising personnel on the last two included mostly workers who had been trained in the methods of the original technique; production had increased but scrap losses had not declined to the point expected. The second and third shifts were not following closely the new technique. When this was corrected, scrap losses were cut 60 per cent which, coupled with higher production, reduced the cost of the unit and allowed the producer to make a lower price to the government.

How cost information can assist production management was also reviewed by Mr. Ebert, based on experience with manufacture of an engine cowling. This cowling, while new in design from an aero-dynamic standpoint, was built in accordance with regular construction practice followed at the time in production of engine cowlings. The design was good aero-dynamically, but in service the replacement cost was especially high. Through cost analysis it was established that cost of fabricating this unit was all out of proportion to other portions of the airplane built in a different manner.

Attention of the engineering, tooling and fabricating departments was brought to this particular part. A new design, aero-dynamically the same as the first, resulted in a reduction in cost to one-third of the original. The service problem was all but eliminated, the new unit being stronger in construction while savings involved made it possible to produce more units in a shorter period and made available additional manpower.

Job cost systems are often too complicated for wartime high production programs, the speaker said. He urged product cost analysis. Total cost accumulations against a product will permit prompt adjustment of variable costs. Loose cost controls may also lead to inventory accumulations, tying up capital in materials made idle by revised plans.

In the use of the product cost analysis the accountant is handling daily the actual cost of the product as compared to the standards established, and obtaining variances daily, making it possible to bring to the attention of production management the causes of these variances; if serious, production management can immediately correct the causes of these variances at their inception.

E. J. Tribble, assistant manager, Harrison Works, Worthington Pump & Machinery Corp., said the WPB Controlled Materials Plan must be taken into consideration for production planning and cost controls. He indicated supplies of materials would be more closely related to production needs and that a 45-day inventory must be expected. Fluctuating labor supply will be another important factor in planning and costs.

Upward revision of war production schedules in precision manufacture was discussed by George W. Allison, assistant works manager, Mergenthaler Linotype Co., Brooklyn.

He described his company's production schedule which enables the shop to increase operating time approximately 30 per cent.

Mergenthaler was operating on a two-turn basis at the start of the war production expansion, 113 machine operating hours out of a possible 168. Due to the skill required and precision nature of the products, the usual three-shift eight-hour day was discarded as impractical; unless further complicated by a swing shift arrangement, it still meant a six-day work week.

Machine Operation Up 92 Per Cent

Under the plan each employe works 11 hours for six consecutive days, then has two days off. On three machines as a unit, the three regular operators per shift, plus one additional operator per shift, operate the machines 22 hours each day, seven days a week. This gives a machine operation of 154 hours of a possible 168 hours, approximately 92 per cent maximum against 67½ per cent previously.

Saturdays and Sundays are considered the same as any work day in this plan; the sixth consecutive day is a time and one-half day, while the seventh is a double time day.

Foundry Apprentice Contest Scheduled for April 28-30

The annual Apprentice Molding and Patternmaking competition sponsored by the American Foundrymen's Association will be continued in 1943. The group's apprentice training committee has announced a contest to be held in connection with its St. Louis convention, April 28, 29 and 30. Contest is open to all indentured apprentices in gray-iron, steel and nonferrous molding and patternmaking with cash prizes offered in each classification for entries submitted from local competitions.

Copies of regulations and blueprints are available at the offices of the AFA, 222 West Adams street, Chicago.

Curtailment of Armament Schedules Attributed to "Fluidity of War"

RESPONSIBILITY for the cutting down or terminating of manufacture of certain types of war material, which curtailment has caused concern in many industrial areas, is placed upon the "fluidity of war", by Maj. Gen. Levin H. Campbell Jr., chief of ordnance, services of supply, War Department, Washington. "Warfare is not static and the Army's requirements are determined solely by combat situations once the enemy is engaged on a large scale," he declared.

General Campbell, one of the two principal speakers at the forty-ninth annual dinner meeting of the Illinois Manufacturers' Association in the Palmer House, Chicago, last Tuesday, discussed "Ordnance on World Battle Fronts". Joseph C. Grew, former ambassador to Japan. spoke on "Our War Efforts in Fighting Japan". More than 2000 guests, including distinguished Army officers and industrial leaders from the middlewestern and eastern states, attended the dinner. Military character of the event was in observance of the first anniversary of the Japanese attack on Pearl Harbor.

"Today the United States has the longest lines of communication in the history of warfare," said General Campbell. "No other nation could maintain them. By these extended lines of communication, each numbering thousands of miles, while our enemies' lines are numbered by hundreds of miles, the United States is nevertheless carrying the war to the enemy.

"Over these lines also are going vast quantities of war materiel for our allies Militarily, 'exterior lines' of communication are a tremendous disadvantage. However, the fact that our Navy and Air Forces are keeping these lines open also enables us to keep the enemy from the continental United States. And don't let anyone think for a moment Japan and Germany do not have plans for invading this country."

The general made it clear that "the American high command has determined production emphasis must be placed upon ships and aircraft. Certain other types of war materiel are being 'de-emphasized' simply because we have them in sufficient quantity at this time. It does not mean we aren't going to need more of the de-emphasized items. We may, or we may not. The 'fluidity of war' will determine that.

"A specific example of the fluidity of war with its resultant effect upon production is the anti-aircraft ammunition situation in the British Isles. There was a recent period of nearly 27 days wherein not a single antiaircraft gun was fired.

"In war, daily ammunition requirements are computed on a basis known as the unit of fire of each type of weapon. The unit of fire means that so many rounds of ammunition are supplied daily. The number of rounds in each unit of fire for each weapon is established by combat experience, past or present.

"Purpose of units of fire is two-fold. One is to provide an adequate quantity of all types for each weapon in the Army. The second is to determine the Army's overall ammunition program in all phases."

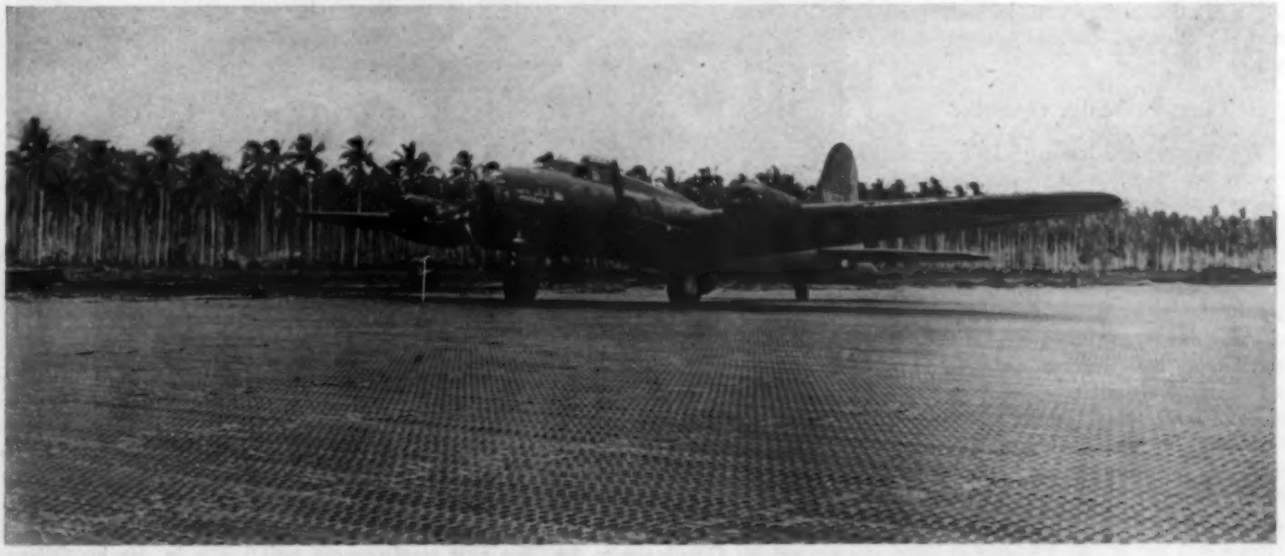
According to the general, "the unit of fire for the British anti-aircraft guns had to be high enough for each gun to do its share in repelling a blitz. When more than two weeks pass without a single gun being fired, it is obvious that an ample supply of reserve is on hand. The fluidity of war therefore results in de-emphasizing anti-aircraft ammunition."

Thus, in explaining the recent orders curtailing or cancelling manufacture of certain ordnance items, General Campbell said "It would be a mistake in any nation to carry on capacity production under similar circumstances. The material for anti-aircraft shell can be better employed on war items more urgently needed.

"Manufacturers are familiar with the 'fluidity of merchandise' in peacetime. They manufacture what the customers want to buy. If one item moves faster than another, because of consumption or purchase, that item is emphasized and

(*Please turn to Page* 106)

MADE IN THE UNITED STATES; LAID IN GUADALCANAL



AMERICAN-BUILT steel mats are being laid on Guadalcanal to form airfields for the fighters and bombers of the United States Marines. The steel mats, perforated to permit native foliage to grow through the holes, are a development of the war. They may be laid quickly, repaired easily. U. S. Marine Corps photo

Labor Priority Ratings Set Up; Iron, Steel Output at New Peak

TORONTO, ONT.

NEW labor priority ratings have been established in Canada for the more important industrial operations and officials are preparing ratings for other firms in intermediate classifications. After consultation with the Department of Labor, Department of Munitions and Supply and the Wartime Prices and Trades Board the ratings were prepared by the National Selective Service. Industry has been placed in four classifications, "A" for top priority; "B" for high priority; "C" for low priority and "D" for no priority.

The highest division includes firms on the essential list of the Department of Munitions and Supply and industries most essential to war work and civilian efficiency. The "B" list includes those important to war work or essential to civilian life and efficiency and the "C" list those important to civilian life and efficiency. The fourth classification includes those regarded as not essential.

The "A" rating covers those engaged in mining operations; war production, such as shipbuilding, aircraft, ordnance; iron and steel manufacture; ferroalloys; scrap collection; automotive transport; electrical, metalworking, machinery and aluminum production; metal smelting and refining.

"B" rating includes other nonferrous metals not in the first group; nonmetallic minerals; abrasives; building glass; electrical goods for civilian use. The "C" classification embraces newspaper printing and publishing; manufacture of clothing; household furniture and others.

Pump Production Controlled

The nonessential trades include manufacture of lace, mats, rugs, artificial flowers, jewelry and many paper products.

To conserve critical materials in Canada and avoid importation from the United States of parts now difficult to obtain, the Department of Munitions and Supply has issued an order freezing types of circulating, condensing and vacuum pumps which maye be made in Canada and limiting types of control equipment which may be used to regulate these pumps. The order also prohibits manufacture of vertical types of these pumps and use of ball bearings in them, except by written permission. Another order prohibits manufacture of humidifiers for all industrial uses, except by permit. A third order prescribes types and sizes of surface heating coils.

Pig iron production in Canada during October reached the highest monthly record in the country's history with a total of 175,424 tons, while output of steel ingots and castings at 271,127 tons was only slightly below the record of 272,247 tons, made in May, 1942. New all-time highs were made in pig iron, steel and ferroalloys in the first ten months this year.

Comparisons in pig iron, steel and ferroalloy production are as follows:

	Steel ingots, castings	Pig iron	Ferro-alloys
Oct. 1942	271,127	175,424	18,266
Sept. 1942	244,922	155,900	18,548
Oct. 1941	249,595	153,568	18,826
10 Mos. 1942	2,579,715	1,640,075	177,336
10 Mos. 1941	2,208,535	1,212,088	174,105
10 Mos. 1940	1,847,293	1,057,702	118,004

C. G. Bateman, metals controller, has issued an order placing wrought copper and brass under direct allocation, consolidating previous directives. Sales of 300 pounds or more must have the controller's approval and sales under 300 pounds may be made without permit only if for a purpose necessary to war production, public health, communications, transportation or other essential use. More than 98 per cent of wrought brass or copper produced in Canada is being used in manufacture of war supplies, with less than 1 per cent for essential civilian uses.

A new board of directors has been appointed for Victory Aircraft Ltd., the government company recently formed to operate the Malton, Ont., aircraft plant formerly owned by National Steel Car Corp. Ltd. New officials are: President, J. P. Bickell, president of McIntyre Porcupine Mines Ltd. and director of International Nickel Co. of Canada Ltd.; directors, S. H. Logan, president of Canadian Bank of Commerce; Donald MacAskill, director of International Nickel Co. of Canada Ltd.; E. C. Fox, chairman, Canadian Cottons Ltd., and W. Kaspar Fraser, barrister, all of Toronto.

Gordon F. McDougall, general manager of Port Arthur Shipbuilding Co. Ltd., Port Arthur, stated that his company has received a contract from the Department of Munitions and Supply for construction of minesweepers representing expenditure of upwards of $5,000,000.

STEEL-CARCASS BELT LIFTS ORE FROM OPEN PIT

IRON ORE travels up a 1100-foot slope, and is lifted a vertical distance of 240 feet from base of pit to loading tipple on the rim of an open pit mine, on this steel-carcass conveyor belt, developed by Goodyear Tire & Rubber Co. Reported by Goodyear to be "the first steel-carcass belt," it is in use by Oliver Iron Mining Co., U. S. Steel Corp. subsidiary, near Hibbing, Minn. Although no thicker than a conveyor belt with six plies of fabric, its wire-carcass strength is "actually the equivalent of 14 such plies"

First Year of War Shows Marked Forward Strides

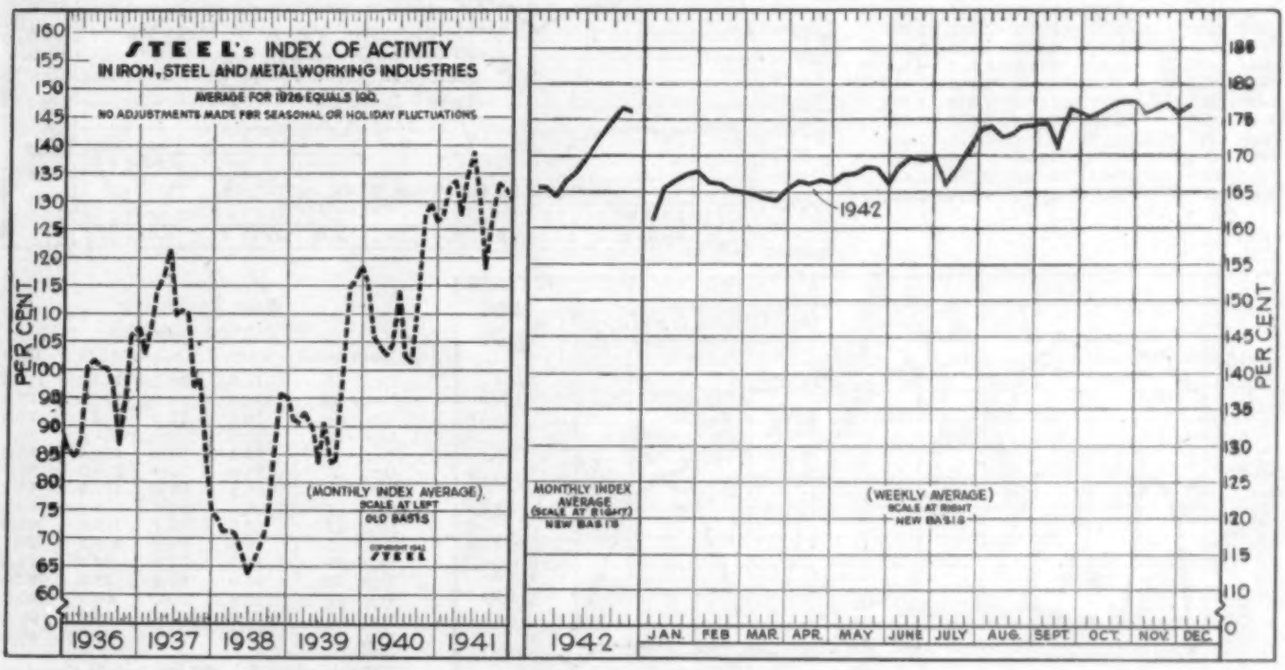
IN ONE year of war our potential productive capacity of military goods has been increased to the extent that it cannot be adequately serviced at present by either certain critical raw materials or by manpower.

Production of combat armaments is currently exceeding that of all the axis nations combined. WPB reports that naval ship construction in 1942 will be more than three times last year's total. Output of merchant ships will be five times greater than in 1941, while that of ordnance is six times the 1941 total. Production of planes is expected to be three and one-half times the previous year's showing.

During the week ended Dec. 5, STEEL's index of activity advanced to 177.1, reflecting upturn in steelmaking operations, freight carloadings and electric power consumption. The index currently is 3.1 points above the preceding week's figure, but is 0.7 point below the all-time peak recorded during the period ended Oct. 31 last.

The national steel rate rose one-half point during the week ended Dec. 5 to 99.5 per cent. This compares with 96.5 per cent in the corresponding week last year. Since the middle of October ingot production has fluctuated between the narrow limits of 99 and 99.5 per cent. The expected tapering off in collections of steel scrap has developed recently. However, mills are confident that sufficient material from usual sources will continue to be made available over the winter months to sustain practical capacity operations.

Electric power consumption climbed to a new all-time peak of 3,883,534,000 kilowatts during the week ended Dec. 5. This represents a gain of 13.7 per cent over the 3,414,844,000 kilowatts consumed in the comparable week last year. Early estimate of revenue freight carloadings for the latest period shows a slight gain to about 755,000 cars.



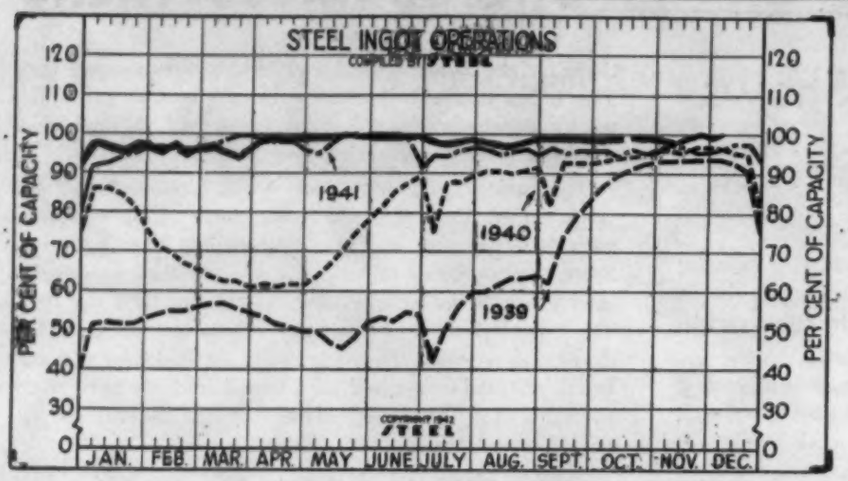
STEEL's index of activity gained 3.1 points to 177.1 in the week ending Dec. 5.

Week Ended	1942	1941
Oct. 3	175.5	132.7
Oct. 10	176.5	132.3
Oct. 17	176.9	133.4
Oct. 24	177.7	133.5
Oct. 31	177.8	133.8
Nov. 7	175.6	134.4
Nov. 14	176.2	133.8
Nov. 21	177.3	128.4
Nov. 28	174.0	132.2
Dec. 5	177.1†	133.4

†Preliminary.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	165.7	127.3	114.7	91.1	78.3	102.9	85.9	74.2	58.5	48.6	54.6	69.1
Feb.	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	174.8	126.4	113.5	96.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	....	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

Note: Weekly and monthly indexes for 1942 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production.



Steel Ingot Operations

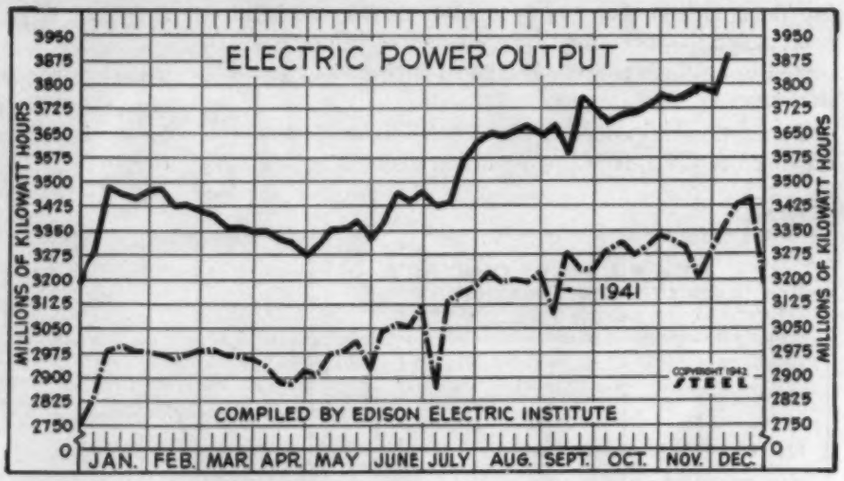
(Per Cent)

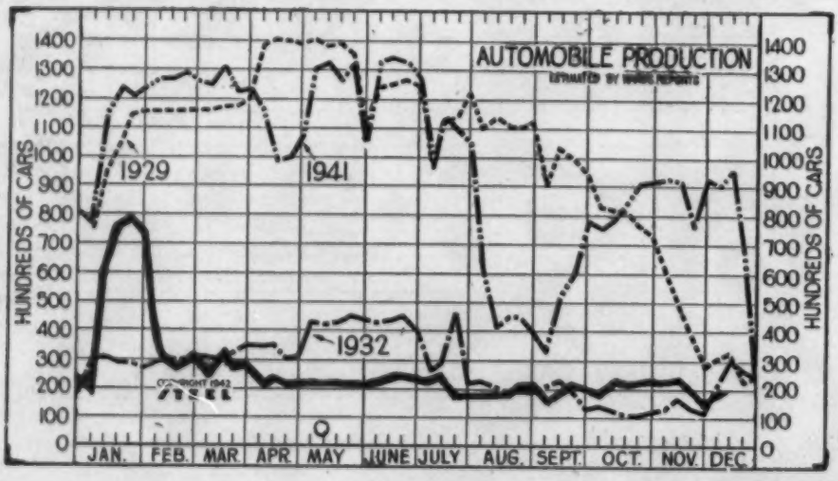
Week ended	1942	1941	1940	1939
Dec. 5	99.5	96.5	96.5	94.0
Nov. 28	99.0	95.0	97.0	94.0
Nov. 21	99.5	95.5	97.0	93.5
Nov. 14	99.0	97.0	96.0	93.5
Nov. 7	98.5	97.5	96.5	93.0
Oct. 31	99.0	95.5	96.5	93.0
Oct. 24	99.0	95.5	95.5	92.0
Oct. 17	99.0	96.5	95.0	91.0
Oct. 10	98.5	94.5	94.5	89.5
Oct. 3	98.0	96.0	93.5	87.5
Sept. 26	98.0	96.0	96.0	84.0
Sept. 19	98.0	96.0	93.0	79.5
Sept. 12	98.0	96.5	96.0	74.0
Sept. 5	98.0	95.5	82.0	68.0
Aug. 29	98.0	96.5	91.5	64.0
Aug. 22	97.5	96.0	90.5	63.5
Aug. 15	97.0	95.5	90.0	66.5

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Dec. 5	3,884	3,368	2,976	2,654
Nov. 28	3,766	3,295	2,932	2,605
Nov. 21	3,795	3,205	2,839	2,561
Nov. 14	3,776	3,305	2,890	2,587
Nov. 7	3,762	3,326	2,858	2,589
Oct. 31	3,775	3,339	2,882	2,609
Oct. 24	3,753	3,299	2,867	2,622
Oct. 17	3,717	3,273	2,838	2,576
Oct. 10	3,702	3,315	2,817	2,583
Oct. 3	3,683	3,290	2,792	2,554
Sept. 26	3,720	3,233	2,816	2,559
Sept. 19	3,757	3,232	2,769	2,538
Sept. 12	3,571	3,281	2,773	2,532
Sept. 5	3,673	3,096	2,592	2,376
Aug. 29	3,640	3,224	2,736	2,442
Aug. 22	3,674	3,193	2,714	2,434


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COPYRIGHT 1942 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
Dec. 5	19.9	90.2	124.8	115.5
Nov. 28	14.6	93.5	128.8	93.6
Nov. 21	18.3	76.8	102.3	72.5
Nov. 14	20.2	93.0	121.9	86.7
Nov. 7	20.2	93.6	120.9	86.2
Oct. 31	20.9	92.9	118.1	82.7
Oct. 24	20.8	91.9	117.1	78.2
Oct. 17	20.2	85.6	114.7	70.1
Oct. 10	20.3	79.1	108.0	75.9
Oct. 3	19.9	76.8	105.2	76.1
Sept. 26	20.9	78.5	96.0	62.8
Sept. 19	21.0	60.6	78.8	54.0
Sept. 12	19.6	53.2	66.6	41.2
Sept. 5	16.9	32.9	39.7	26.9
Aug. 29	21.1	40.0	27.6	25.2

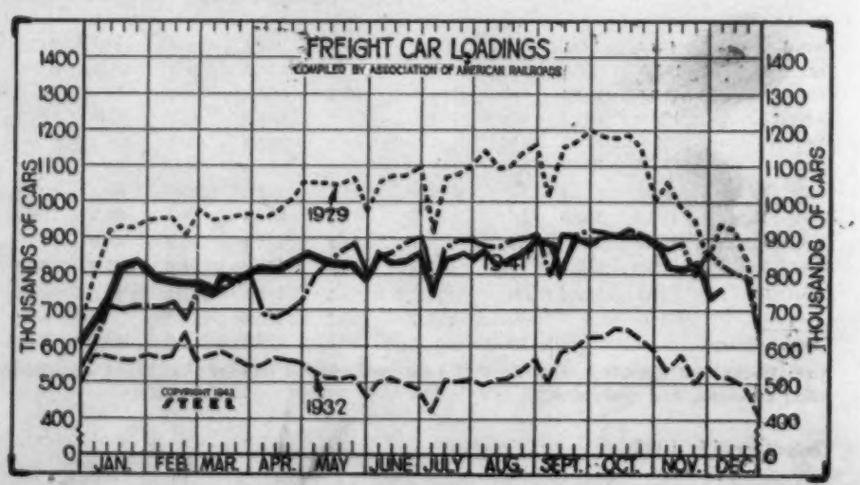
Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Dec. 5	755†	833	739	687
Nov. 28	844	866	729	689
Nov. 21	836	799	733	677
Nov. 14	827	884	745	771
Nov. 7	829	874	778	786
Oct. 31	891	895	795	806
Oct. 24	903	914	838	834
Oct. 17	901	923	814	861
Oct. 10	910	904	812	845
Oct. 3	908	918	806	835
Sept. 26	898	920	822	835
Sept. 19	903	908	813	815
Sept. 12	815	914	804	808
Sept. 5	888	798	695	667

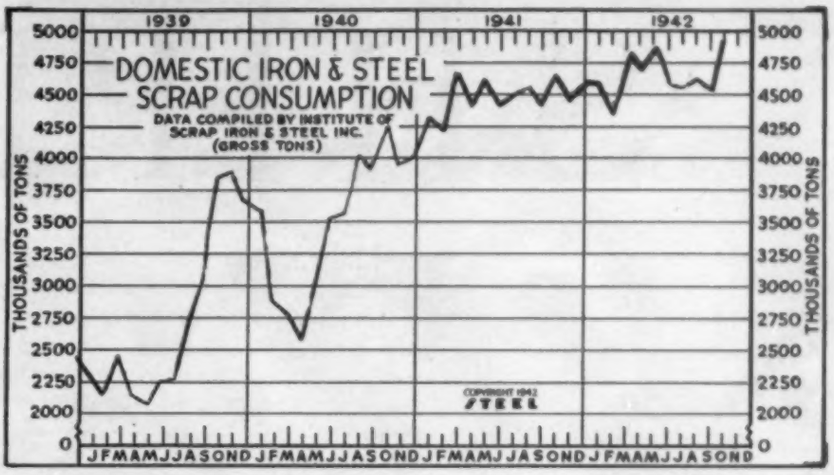
†Preliminary.

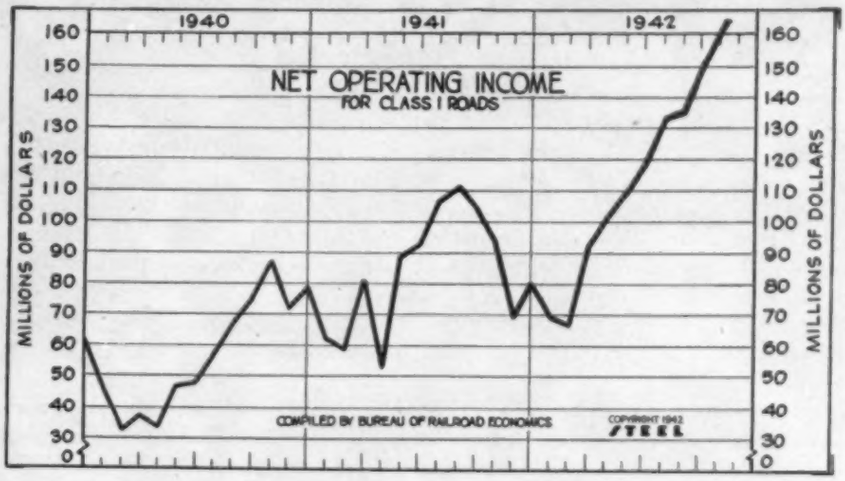


Iron and Steel Scrap Consumption

(Gross Tons)

	1942	1941	1940	1939
		(000 omitted)		
Jan.	4,590	4,278	3,581	2,257
Feb.	4,276	4,172	2,812	2,124
Mar.	4,840	4,662	2,728	2,419
Apr.	4,672	4,406	2,548	2,114
May	4,857	4,609	3,061	2,079
June	4,608	4,406	3,482	2,221
July	4,600	4,415	3,526	2,247
Aug.	4,645	4,518	3,968	2,675
Sept.	4,883	4,392	3,876	3,018
Oct.	....	4,649	4,233	3,809
Nov.	....	4,482	3,922	3,858
Dec.	....	4,634	3,950	3,613
Total	....	53,623	41,687	32,434
Mo. Av.	....	....	3,474	2,703





Class I Railroads
Net Operating Income

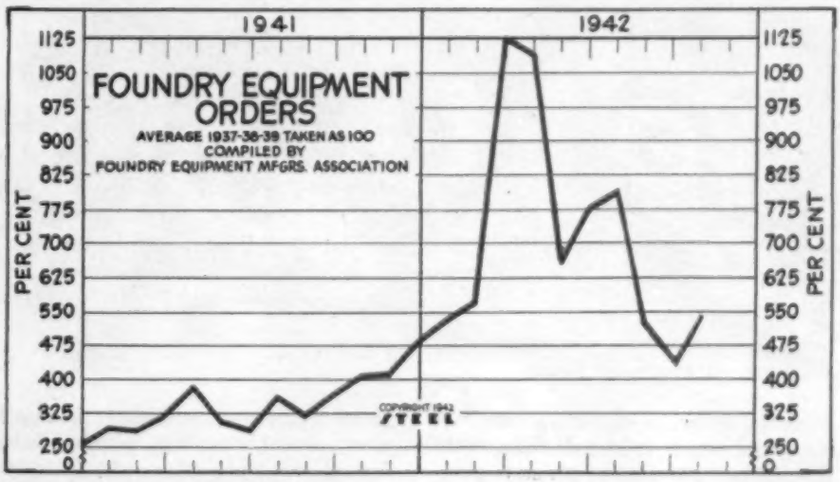
(Unit: $1,000,000)

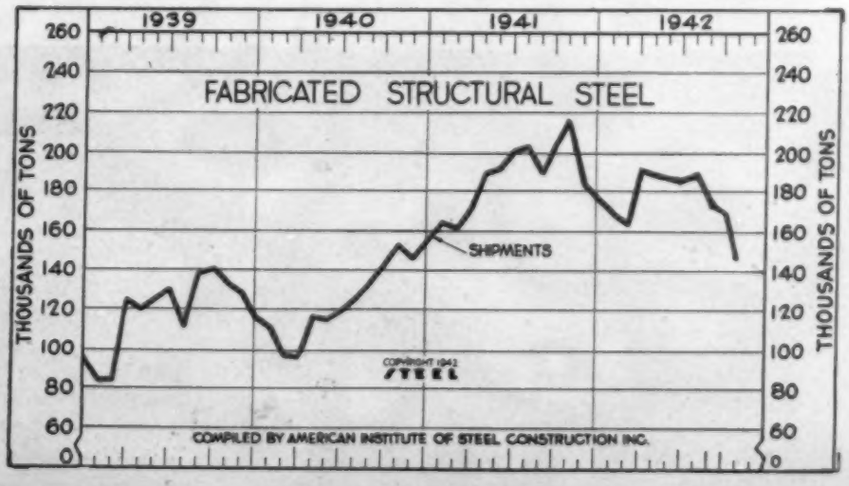
	1942	1941	1940	1939
Jan.	$68.97	$62.02	$46.01	$32.95
Feb.	66.49	58.48	32.86	18.64
Mar.	92.39	80.63	37.03	34.38
April	102.03	52.57	34.12	15.32
May	109.63	88.63	47.41	25.17
June	118.73	93.26	48.09	39.17
July	133.00	106.31	57.73	49.00
Aug.	135.26	111.32	66.53	54.57
Sept.	154.63	104.07	74.72	86.58
Oct.	184.08	93.66	87.64	101.72
Nov.	....	68.76	72.00	70.41
Dec.	....	80.55	78.79	60.95
Average	....	$83.29	$56.84	$49.02

Foundry Equipment Orders

Monthly Average (1937-38-39 equals 100)

	1942	1941	1940
Jan.	532.7	285.3	149.0
Feb.	567.9	281.1	135.7
March	1122.4	315.2	183.2
April	1089.3	377.2	145.2
May	653.6	298.7	129.1
June	774.0	281.1	164.9
July	800.8	358.1	194.4
Aug.	510.8	312.9	165.4
Sept.	446.4	383.8	161.2
Oct.	540.6	403.8	264.0
Nov.	....	408.5	254.2
Dec.	....	481.2	257.8
Year	....	345.6	184.0





Fabricated Structural Steel

(1000 tons)

	Shipments			Bookings		
	1942	1941	1940	1942	1941	1940
Jan.	167.8	164.6	110.9	183.4	281.2	81.7
Feb.	164.6	161.4	97.2	228.7	173.6	98.9
Mar.	191.3	170.2	95.9	248.3	206.1	128.3
Apr.	187.2	189.8	116.3	314.0	218.0	73.8
May	184.2	191.9	115.6	161.0	179.9	126.8
June	182.7	200.5	119.1	184.5	246.9	109.7
July	189.9	203.0	127.1	125.2	214.8	194.9
Aug.	173.9	189.3	134.9	80.6	158.7	122.5
Sept.	169.8	204.1	142.8	68.5	158.8	225.5
Oct.	146.6	217.7	153.2	46.8	128.7	233.1
Nov.	....	182.6	147.0	....	184.0	141.9
Dec.	....	176.1	155.5	....	146.4	203.1
Tot.	....	2251.1	1515.5	....	2297.0	1748.1

SHIPBUIL

FOR THE first time since World War I days, Ashtabula, one of Ohio's ore and coal ports, is building ships again—the same kind of ships that built Ashtabula. Four big 621-foot Great Lakes bulk freighters, among the largest on the lakes, are being built at the Great Lakes Engineering Corp.'s shipyard on the Ashtabula river between the city of Ashtabula and Ashtabula Harbor. The United States Maritime Commission will sell or lease the vessels to lake fleet operators.

The four vessels will make an important addition to the Great Lakes cargo fleet, being exceeded in size by only the five vessels built for the Pittsburgh Steamship Co. and only two or three of the older vessels. The older vessels, just slightly larger, are the Bradley Line's CARL D. BRADLEY, previously rated the lakes' biggest ship; the Interlake Steamship Co.'s HARRY COULBY, and the Canada Steamship Lines' LEMOYNE, which once held some of the lakes' cargo-carrying records.

The new Ashtabula-built vessels will be 621 feet long with 60-foot beams, and will handle about 16,000 net tons of cargo per trip. The Pittsburgh Steamship Co. vessels are 67 feet in beam and 641 feet long, their size limiting them to only a few ports in the lakes.

However, the Ashtabula fleet is being built to operate into most of the lake ports so their size had to be restricted.

The vessels apparently will be popular with lake fleet operators for already many different lines have been bidding with the Maritime Commission for sale or lease of the vessels.

Construction of the vessels marks the re-entry of Ashtabula into the shipbuilding business after a lapse of about a quarter of a century. The yards built a number of lake freighters, many of them still in operation, prior to and during World War I. But after the war, the yard was used chiefly for outfitting the winter fleet, making repairs and drydocking damaged vessels or those in for inspections.

Much of the steel for the fleet is coming from Youngstown, Pittsburgh and Chicago steel mills, which the fleet, when completed, will serve.

Construction of the vessels is an interesting sight. Built on a long concrete pier supporting the keel, they are propped up on a forest of timbers, and are surrounded by a maze of scaffolding.

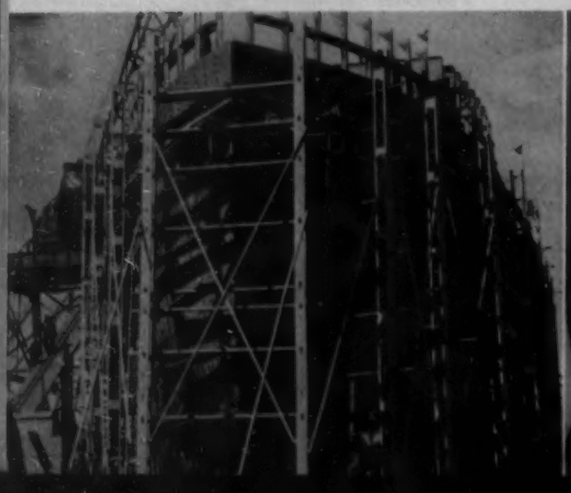
Squat, long and square-bottomed, the vessels are ugly in their scaffolding as they lack the sleek lines of the large salt-water vessels. But they are considered the world's most efficient cargo vessels, carrying more cargo at less cost than ocean-going ships of comparable size.

Above, traveling gas-cutting machine automatically cuts off overhang on plates on fantail

Directly below, view of a 621-foot freighter being built at Ashtabula. Note giant derrick with big boom used to place sections in the structure

Hand welding is employed for much work, also, Union Melt machine being limited to application of downhand welds

Automatic Union Melt welding machine and runway on which it travels, joins bulkhead plates. Portable unit can be rigged up quickly where needed



DING *at Ashtabula*

By GEORGE R. REISS

Above, view of uncompleted stem of one of four 621-foot freighters. Special derrick at left works over two ways as can be seen by arms extending both ways

Subassemblies, below, are built up on these waist-high supports by cutting and welding, later positioned by cranes for welding into main structure

This view, below, taken in a cargo hold gives a rough idea of the immense size of these large ships that sail the lakes during the summer

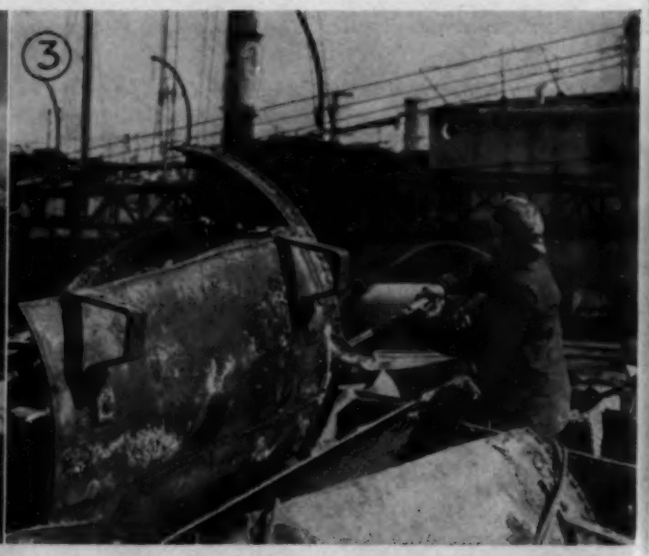
WAR SPEEDS *Propane*

Fig. 1—These parts scrapped from an old battleship no longer serviceable were long ago converted into steel for our armed forces

Fig. 2—An old battleship being scrapped. This view was taken long before Dec. 7, 1941

Fig. 3—Closeup of operator wielding a propane cutting torch in the process of scrapping an old battleship

Fig. 4—To facilitate the scrapping operations, whole sections are cut free and removed for further cutting away from the ship



By GERALD E. STEDMAN

Cutting Progress

IF HITLER knows of all the improvements being made in our productive abilities, it must make his rudder shudder. Much of this advancement has come, not from the origination of new processes and methods, but by refinement of the old. The more extensive industrial use of propane gas is a good example.

Results were far from satisfactory when propane was first employed as a cutting fuel. Original torch equipment was incorrectly designed so the resultant oxygen consumption was all out of proportion, and the use of oxypropane cutting just didn't make sense. That unfavorable impression became widespread although, back of it all, a few designers finally began to give oxypropane cutting the exclusive engineering attention it deserved and set about to develop original torch and tip designs that finally have eliminated its original disadvantages.

The comparatively low flame temperature of propane in oxygen of 5280 degrees Fahr. appears to be of material benefit in most types of cutting operations. Steel sections up to 34 inches in thickness have been cut successfully by oxypropane without the use of an oxygen lance.

Due to its excellent performance, industrial uses of propane have been gradually extended. For reasons that defy explanation, its popularity has seemed to center in the Pittsburgh steel district, where it has been so successfully and economically used that one equipment company alone is reported to have shipped 150,000 cutting torch tips into the area in 1937 for use with gases other than acetylene.

However, the war brought a great increase in the need for metal cutting in thicknesses not customarily experienced. The amount of metal cutting required in armor and ship plate has vaulted. This expansion has meant the search for better methods, quicker production, greater economy, fewer man-hours, elimination of handling difficulties. Oxypropane cutting appears to possess these advantages.

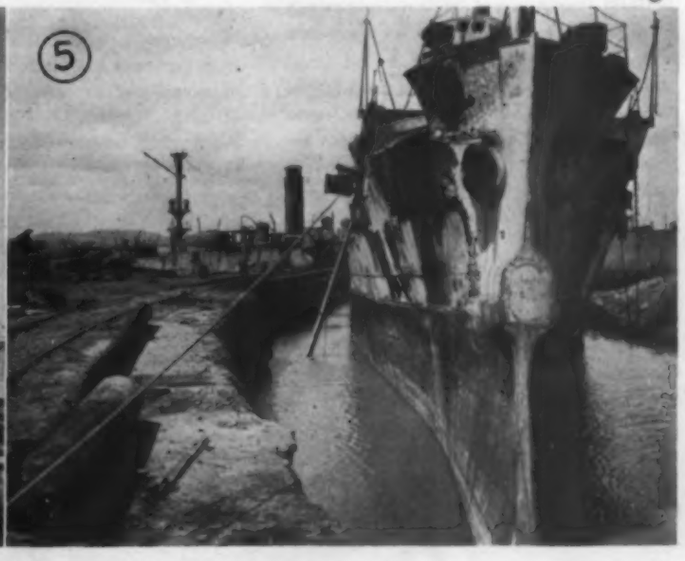
It is impossible because of censorship to report specifically on many important oxypropane operations or to provide data indicating its effectiveness and economy. Among locations where interesting use of the technique exists are: Newport News Shipbuilding & Drydock Co., Philadelphia Navy Yard, Brooklyn Navy Yard, Robins Dry Dock & Repair Co., Watertown arsenal, Norfolk Navy Yard, Portsmouth Navy Yard, Dodge Steel Co., General Steel Castings Corp., Harrisburg Steel Corp.

Any properly accredited firm probably can obtain details on performance data at these plants, once the decision has been made to investigate.

Propane is one of the paraffin series of lighter hydrocarbons recovered from natural gas in winning natural gasoline or from oil refinery gases by special fractionation equipment. Its potential supply is extremely large. Constancy of composition, flexible use and advantageous physical characteristics make it desirable for general processing work. It is particularly flexible for general foundry use. Its high heat content of 91,800 B.t.u. per gallon and a range of available pressures without booster requirements permit its effective transportation through pipe lines of small diameter yet in sufficient volume for any plant utilization. Specific gravity is constant. Balanced pressures are easily maintained.

Recent observations among a number of foundries have indicated that the use of industrial propane is increasing in marked manner, not alone for flame cut-

Fig. 5—End view of old battleship in process of being cut up for scrap. Note railroad running alongside for fast transportation of scrap by means of locomotive cranes and cars. Figs. 1, 3, 4 and 5 furnished by Standard Oil Co. of California



Figs. 6 and 7—Burning risers off of cast steel parts at the Dodge foundry. Figs. 6, 7 and 8 furnished by Dodge Steel Co.

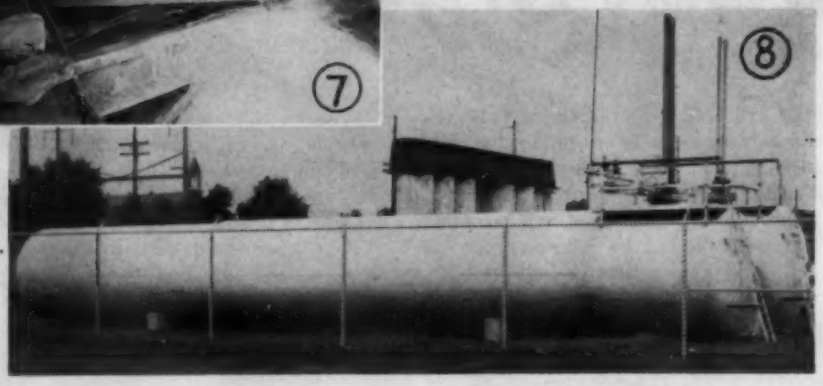


Fig. 8—These two tanks store 30,000 gallons of propane at Dodge Steel Co., Tacony, near Philadelphia

ting but also for such work as annealing castings, baking cores, melting nonferrous metals, preheating electric furnaces, drying molds, heating ladles, as well as for miscellaneous laboratory and heating uses.

The equipment required for a plant installation is relatively simple. A storage tank of sufficient capacity to receive tank car loads is installed, usually above ground and connected to a plant piping system. See the typical installation in Fig. 8. Since propane exerts a vapor pressure of approximately 120 pounds per square inch at 70 degrees Fahr., this pressure can be reduced to that desired for burner operation by conventional gas regulators. Where the rate of use is high, vaporization is accomplished by means of a heat exchanger. One of the best tanks is 57 feet 4 inches long with a 15,000-gallon capacity and an 87-inch inside diameter. It is constructed in accordance with the ASME unfired pressure vessel code for working pressures of 200 pounds per square inch.

In the majority of installations, propane vaporizes within the tank, passes out through proper pressure regulators into the service piping to the various gas burning stations. It is piped around the plant at 30 pounds pressure, and individual regulators at each outlet reduce the pressure to that desired for each job.

One of the most efficient industrial propane installations can be found at the plant of Dodge Steel Co., manufacturers of electric steel castings, whose works are at Tacony, Pa., near Philadelphia. This company produces carbon and alloy steel castings varying in weight from ½ to 2000 pounds. It ships more than 50,000 castings per month. Tank car shipments of approximately 9600 gallons or close to 880,000,000 B.t.u.'s are stored in two 15,000-gallon tanks, Fig. 8, for the use of industrial propane by this concern is unusually extensive.

"Our plant originally installed equipment for the use of propane," Mr. C. S. Roberts, Dodge vice president in charge of operations, told me, "for heating purposes in June, 1936. We were then gas cutting gates and risers from small and medium-weight carbon-steel castings. After some tests and procurement of proper tips and torches, it was decided that the use of propane had some advantages both in cost and operation. Since this original installation, all cutting has been with propane. In this 6-year period, uses of propane in this plant have been unusually extensive.

Propane Safe to Handle

"While it is difficult to obtain accurate comparative costs due to the large number of variables in the size, shape, location and cleanliness of gates and risers on steel castings, we are convinced that there has been no over-all increase in oxygen consumption," Mr. Roberts says. A reduction of cuts on the sprue cutter, increasing the area of gates and risers formerly cut on the sprue cutter by 15 per cent, thus increasing production at no increase in cost, has shown a decrease of oxygen consumption of approximately 8 per cent in relation to the unit area of metal cut in other comparative tests of long duration.

"Buying propane in bulk, its cost for cutting is lower than that of the fuel previously used. The piping of propane to the location of cutting operations at any desired pressure is simple and safe. The handling of bottles and disposal of sludge are eliminated," Mr. Roberts states. Of course Dodge operations have been tremendously expanded, and the economy of just the matter of eliminating the handling of bottles is huge. There is data to prove that the amount of propane for cutting a cross sectional area of 76,000 square inches is only 850 cubic feet.

Mr. Roberts states that on both large and small work his organization is well satisfied with the type of cut as well as the speed, control and economy obtained.

In discussing the matter with E. C. Troy, Dodge Steel Co.'s chief metallurgist, Mr. Troy said, "Let me add that propane has proved extremely easy to handle. There is little possibility of its exploding. Because of its low burning temperature, it is not likely to fuse to adhering sand or slag at the surface to be burned. This allows great latitude in the cleanliness of the casting that can be cut—an important consideration. Operators say they would rather burn with propane because it is easier to handle when sand, scale, or other inert materials are encountered."

According to Mr. Troy, a No. 5 tip is used to burn sections up to 16 inches in diameter, using 65-pound oxygen and 20-pound propane pressure. Tip size No. 4 is used with 45 pounds of oxygen and 20 pounds of propane to burn sections up to 6 inches in diameter.

A very narrow kerf is obtained with the oxypropane flame, and slag adherence is practically nil. A small kerf is, of course, indication that a small volume of steel is being burned away. Every cubic inch of steel removed naturally requires a definite amount of oxygen to effect such oxidation. Thus, a clean, narrow kerf is proof of oxygen economy.

The Dodge experience in cutting risers is that successful results are obtained without resorting to the use of an oxygen lance. This is unusual in that some of the castings produced have risers up to 21 inches in diameter. The oxypropane cutting torch does not tend to carburize or case-harden the edges of

(*Please turn to Page* 118)

How Tool Shapes can cause hardening hazards

When a tool breaks **hours of skilled tool making time are wasted. Whether it is a tool that cracked in the quenching tank, or a die that let go on the press, valuable *production* time is lost. Premature tool failure can often be traced to some oversight in the relation of tool design to heat treatment. We are passing along the following suggestions to help you avoid tool shapes that cause hardening hazards and premature tool failure. They may be of help to the men in your tool room.**

Heat treated steel has a certain strength depending upon the analysis of the steel, the quality of the metal, and its heat treatment. Sometimes just the internal strains set up in heat treating exceed the strength of the metal, and the tool cracks before it sees service. Or, if you get it through hardening safely, it may be so weakened that it fails under relatively light loads.

Internal strains arise from many causes, but the most serious are those developed during quenching, by reason of differential cooling of sections of the tool that are of markedly different size or mass. Thus, the differential cooling is largely controlled by the size and shape of the tool being quenched. It is wise to plan tool shapes so that the entire tool may be heated and cooled at approximately the same rate.

The angled shape here suggests a condition to avoid. It is impossible to get uniform cooling at such sharp re-entrant angles as "A" and internal strains are set up right where service stresses concentrate.

This shape illustrates a light section adjoining a very heavy section. It would be practically impossible to harden such a shape in water without cracking at the sharp corner. Even in oil, it would be difficult.

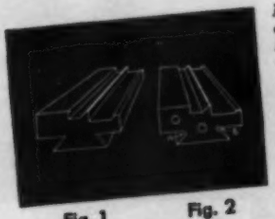


Fig. 1 Fig. 2

Figure 1 shows an undercutting form-tool that would be hazardous to harden because of the heavy and light sections joined by sharp angles. In figure 2 holes have been drilled to balance these heavy sections and "A" and "B" suggest two ways to avoid the sharp angles.

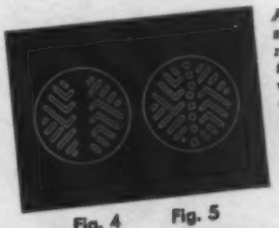


Fig. 4 Fig. 5

Another cause of warping is shown in Figure 4. The heavy rib through the center tends to prevent shrinkage and would cause the die to become oval in quenching. Drilling holes, as in Figure 5, helps overcome the difficulty.

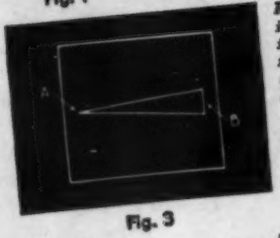


Fig. 3

Figure 3 is an oil-hardening blanking die that failed in service. It was made from a section approximately 3" x 2¾" x ½". Heat treatment and service stresses concentrated at points "A" and "B". A larger section, 3½" x 2¾" x ¾" could have eliminated failure.

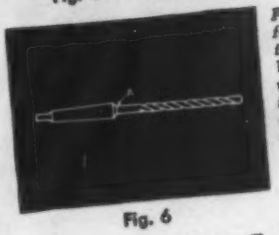


Fig. 6

Figure 6 illustrates a design for twist drills that gave trouble by breaking at "A". When a more generous fillet was allowed at this point, the trouble was eliminated and satisfactory results were obtained.

These tips on the relation of tool design to heat treatment were extracted from "Tool Steel Simplified". They represent only a *part* of the useful information in one chapter of the book. Other chapters provide helpful facts on tool making, heat treating, furnace atmospheres, quenching and many other subjects, including "trouble shooting". Get the benefit of *all* this practical information. Make copies of "Tool Steel Simplified" available to the tool-room men you want to train. Order as many as you need today.

The Carpenter Steel Company, 139 Bern St., Reading, Pa.

315 pages—205 illustrations

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MATCHED
TOOL STEELS

Industrial "TAXI" Service

By GEORGE E. STRINGFELLOW
Division Manager
Storage Battery Division
Thomas A. Edison Inc.
Orange, N. J.

. . . . is one portion of complicated materials handling system that includes a narrow-gage yard and intraplant railroad, 11 highway trucks, two tractor-trailer units with ten 4-wheel trailers, and a complete lift-truck-skid system

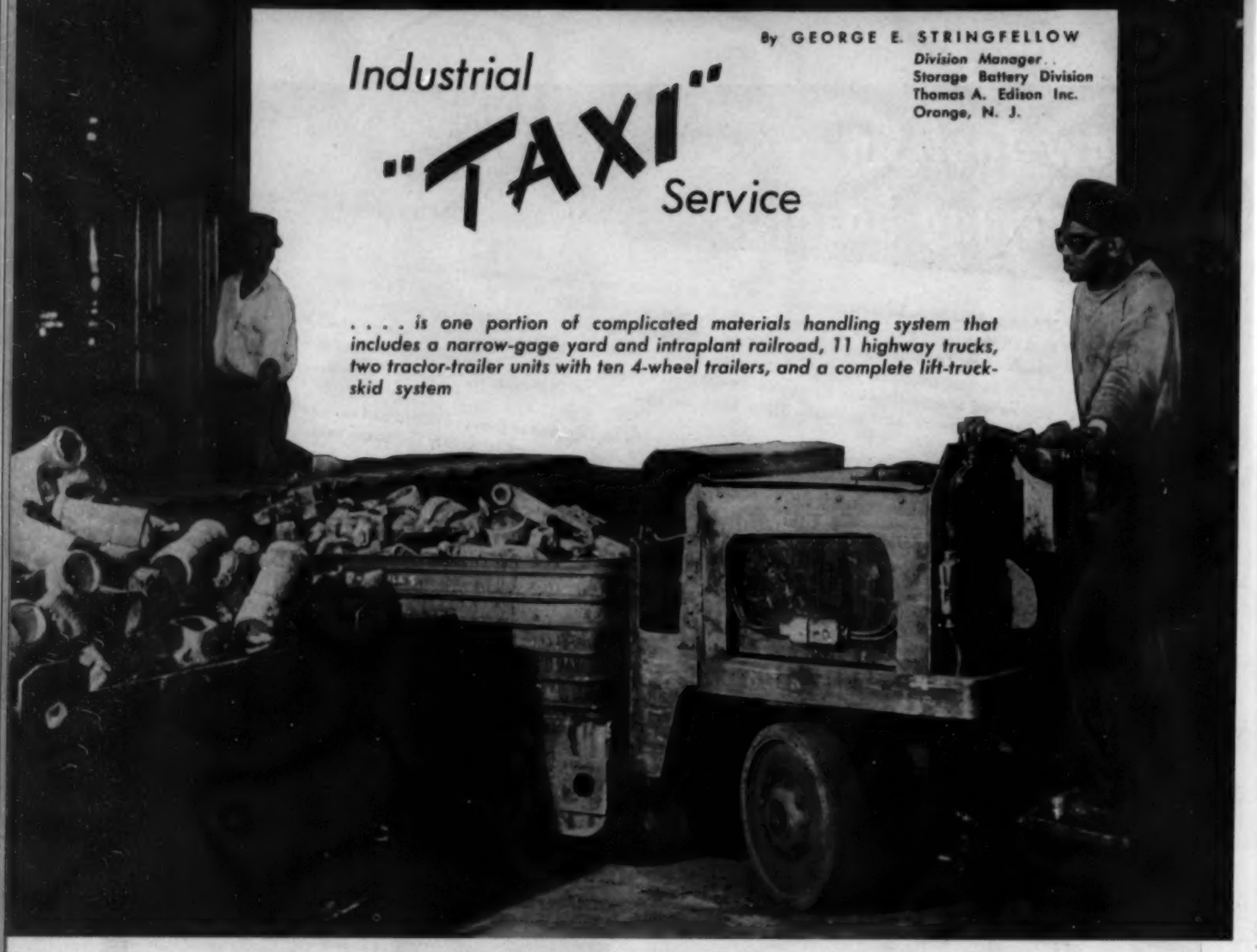


Fig. 1—Small castings are brought from the shakeout operation on the conveyor shown in the background here. Castings next are sorted directly into skid boxes which then are taken by lift truck to processing lines. All photos from Storage Battery Division, Thomas A. Edison Inc., Orange, N. J.

NORMALLY an almost incredible variety of industrial machinery and equipment is produced in the huge Allis-Chalmers plant, but today this variety is more amazing than ever for this company is not only turning out machines for wartime industry at an accelerated pace but also a variety of heavy armament and ordnance work for the Army and Navy. Methods of materials handling are correspondingly varied and are highly developed.

A yard railroad runs between and through the various buildings of the plant. It serves for large quantities of materials going to one destination as well as for single loads too heavy for any available means of transportation—as, for example, a casting for mine-hoist sheave or a hydraulic-turbine housing. Also connecting the various buildings is a network of paved roads on which a fleet of eleven highway trucks, two industrial-type tractors and ten 4-wheel trailers is kept busy transporting smaller lots of materials through the yards.

Within the foundries and shops, the lift-truck-skid system is the most common method of handling materials. Skid containers, designed in almost limitless variety to unitize many different kinds of materials into loads of approximately 2 tons, are the principal handling and storage units through process, through the yard transportation system, and to the point of use at assembly or erection.

In the foundries, the batches are made up in buckets hauled by electric trolley cars underneath storage bins, where the batch ingredients are dumped in, and from there to a hoist, which raises them to the tops of the cupolas. On the casting floor, sand for small, repetitive molding is fed through chutes from overhead, and the molds are carried by conveyors past the pouring operation to the shake-out. Sand for larger molds, made up in smaller lots, is supplied by industrial trucks in dump hoppers.

The molten metal is poured into ladles mounted on skid platforms which are picked up at the cupolas by lift trucks and taken to the pouring lines. Because more than one pouring line is supplied from one cupola, the lift truck has proved to be the simplest, most practical means of doing the work.

From the shake-out operation, small castings are sorted directly into waiting skid boxes, thus keeping the handling motions at an irreducible minimum. These boxes are replaced with empties as they are filled and the loaded boxes delivered by lift trucks to the cleaning operation and then to waiting flat cars, trucks or trailers for delivery to the various machine shops; at destination the skid boxes are unloaded by other lift trucks. Large heavy castings are handled by overhead cranes and rail cars.

In the machine shops, the general methods of handling materials are, to a considerable degree, influenced by the extent to which the operations are repetitive and continuous, or comprise a variety of different kinds of work in the course of a year.

Production of tractors is a good example of the former. Manufacture of tur-

Speed Up GUN BARREL INSPECTION

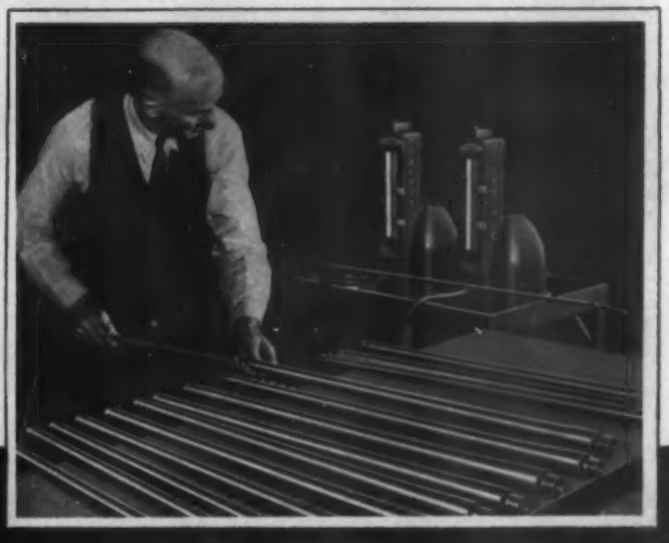
In just one pass through a gun barrel the Sheffield Precisionaire tells the inspector whether or not the bore is within prescribed tolerance or, if not, whether it is oversize, undersize, out-of-round, or bell mouth —also exactly at what point any dimensional discrepancy occurs.

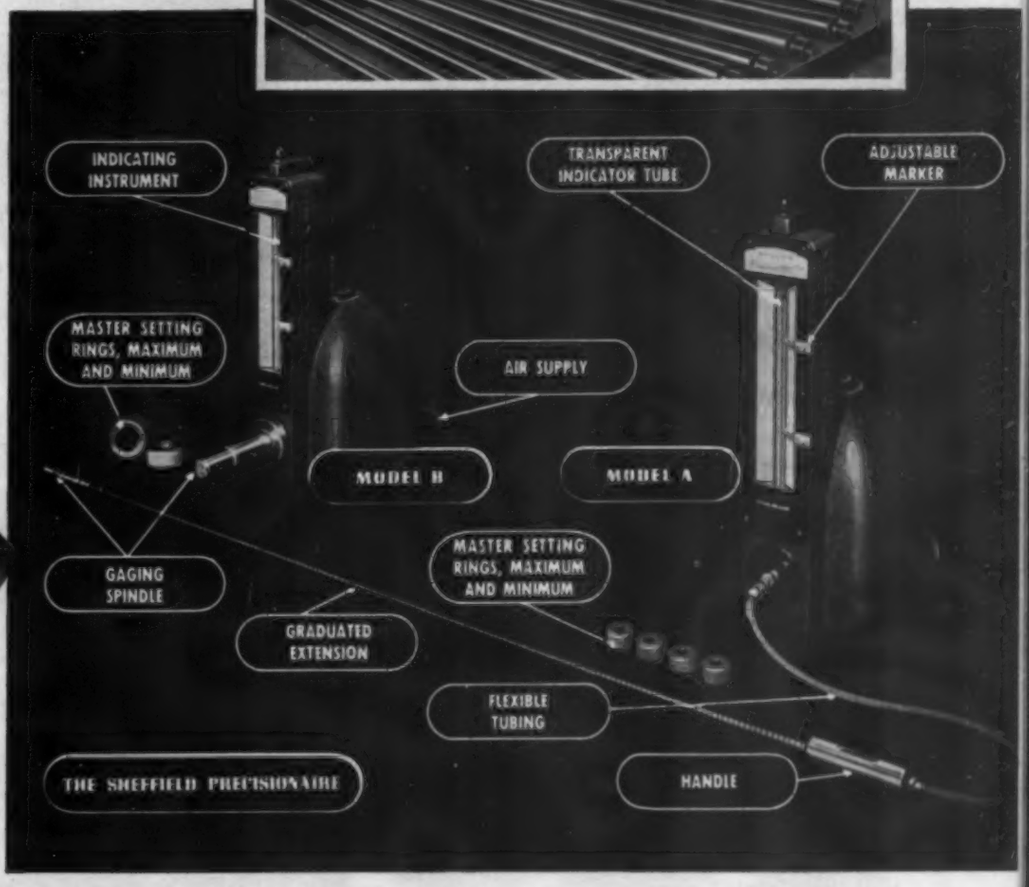
It takes no longer to inspect a gun barrel than it does to push a cleaning rod through it and no more skill, in spite of the fact that the Precisionaire is accurate to .0001". Any new operator having no previous experience can be taught to handle this gage in less than fifteen minutes.

Contrast this speed and this accuracy with inspection by previous methods which were not only slow but which required the highest order of gaging skill in order to maintain accuracy.

The same instrument provided with two slightly different gaging spindles is used to check the bore before rifling and then, by changing the spindle, give it a final inspection after it is rifled.

The Precisionaire, while it is being used extensively for gun barrel inspection, has a number of other very important uses all described in bulletin 42-23. Write for your copy now.





THE *SHEFFIELD*
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DAYTON, OHIO, U. S. A.

SHEFFIELD GAGES
MASTER GAGEMAKERS

Fig. 2. (Upper view)—In the foundry, battery-powered lift trucks carry skid-mounted ladles of molten metal from the cupolas to the pouring lines

Fig. 3. (Lower view)—Lift truck moves stock such as these heavy strips from the annealing furnaces to the sheet metal department in just 5 minutes. The same handling operation formerly required 2 hours when done on the yard railroad

bines, generators, transformers, compressors, crushers and other heavy machinery is a good example of the latter. In the one case, the movement of work follows a routine, and in the other case continuous scheduling and supervision are required.

In the tractor shop, materials are received in skid containers from foundry, forge shop and sheet-metal shop, via the yard transportation system and are unloaded from car, truck or trailer by lift truck and taken to the point of use or tiered nearby. As customary in the automobile industry, there is no store room.

Throughout the production lines, materials are taken directly from the skid containers at the various machines and deposited in others. Lift trucks, their operators familiar with the sequence of operations, keep the skid containers progressing between process and spot empties in position at the same time.

Finished parts, like the incoming materials, are not taken to any central store room but as close as possible to the point on the assembly line where they are to be absorbed. There they are, if necessary, tiered for floor-space economy, with the single exception of the skid containers used for some of the sheet-metal parts. These are skid boxes 5 feet high, designed to provide unit loads of these bulkier items having approximately the same weight—2 tons—as the skid units in which other parts are handled.

Assembly of the tractors starts with torque tubes instead of frames but, with this exception, the operation is substantially the same as that of an automobile assembly line. Lift trucks maintain a constant supply of parts in skid containers beside the line.

A portion of the engine production is diverted for use in the manufacture of power units in another building. For this purpose, skid racks are provided which permit the handling of one or more engines, depending upon size, by lift truck, for loading on one of the yard carriers.

(Concluded Next Week)

ASA Requested To Work on Color Code for Greases

Both the War Production Board and the National Machine Tool Builders Association requested recently work be started at once on a standard color code for lubricants, as a war emergency project, according to the American Standards Association, New York. Purpose of this standard will be to indicate by color the grade of grease or oil to be used in a given part of a machine, thereby preventing costly mistakes on the part of the operator.

Standard color markings, it is reported, will be applied to the machine part to be lubricated and to the container carrying the lubricant required for that part. For example, the oil cap on the spindle bearing of a grinding machine might be painted red and the same color used to mark the container holding spindle oil.

Inexperienced workers now employed in manufacturing plants, make such a standard as the above a practical necessity, according to the machine tool builders who requested the job. A maintenance man erroneously putting grease into the spindle bearing of a grinding machine instead of the fine oil needed, can in a few minutes do enough damage to keep the machine idle for months.

Flexrock Product Repairs Floors as Traffic Rolls

Instant-Use, a ready-mixed floor patch that enables quick repairs to be made to ruts and holes, allowing the floor to be used immediately is reported by Flexrock Co., Philadelphia. Its application requires only five simple steps—sweeping out of hole, priming, application of repair product and repriming edges for sealing.

ARMY E NAVY

Behind the Headlines

PORTER Quality Production Helps win the war

HEADLINES won't win the war. Only rugged fighting, clever strategy, long-time planning and a constant production line will triumph. PORTER uses all these "Victory techniques" in building its Diesel Electric Locomotives. PORTER Diesels are ruggedly built, cleverly designed and planned for future as well as immediate hauling needs. PORTER still produces greater power and speed at less cost per ton moved. Above, a 65 ton double power plant unit, one of the many locomotives supplied by PORTER to the U. S. Army, Navy, and industrial plants.

Only PORTER Builds a Complete Line of Locomotives For Industry

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By HERBERT E. FLEMING

Fig. 6—Broken out section of an interlocking side-milling cutter is being brazed back into place. Note ventilator intake at rear of booth

RECLAIMING TOOLS

⑥

. . . . by low-temperature brazing enables plant to handle tool breakages and tool shortages, assuring uninterrupted war production; low costs

(Concluded from Last Week)

THERE ARE variations in the use of brazing materials and in the application of heat. One of the low-temperature brazing alloys used at Tractor Works is Handy & Harmon's Easy-Flo, an alloy which, as its literature states, has a silver content of 50 per cent, and which flows at 1175 degrees Fahr. This is used with Handy flux.

Another low-temperature brazing alloy used is Eutectic Alloys Inc.'s Castolin, and particularly a rod which it recommends for high-tensile, high-speed steels. The content of this brazing alloy is not published, but it is stated that the "binding temperature" of the material in this rod is approximately 1300 degrees Fahr. This, like each of the Castolin eutectic rods, is used with a corresponding Autochemic flux.

Since ordinary high-temperature brazing with copper alloys requires a temperature of 1600 degrees Fahr. or higher and since most high-speed steels lose their hardness at 1075 degrees, broken and worn cutting tools had to be scrapped in the days before the advent of low-temperature brazing. Thus when brazing at temperatures around 1175 degrees Fahr., heat is applied at 100 or more degrees beyond the ideal and there's where expert handling is required.

On such handling, it is important to have complete penetration by the brazing material of the surfaces to be joined and at the same time the thinnest effective joint to attain necessary tensile strength. For example in butt joints of stainless steel to stainless steel, it has been found that a joint 0.006-inch thick will have a tensile strength of only 90,000 pounds to the square inch, whereas a joint with a clearance of but 0.0015-inch will have the maximum attainable, 134,000 pounds to the square inch.

In view of such requirement, experience has shown that variations in methods of applying heat are necessary. In the case of broken broaches, the pieces with ends to be joined are placed in a vertical position in an alignment fixture. The lower piece is clamped solidly in position. Spring plungers hold the upper piece in place. The torch is applied along the lines of the prospective joint just long enough to cause the brazing material to run. Pressure is exerted by the weight of the upper piece.

The same practice is followed in brazing square forming tools. In some cases a double nozzle torch is used, so as to apply the heat to two sides at the same time. A horizontal fixture is used in brazing small drills that are broken, heat being applied at bottom of the joint. A vertical fixture is used on larger drills.

No fixture is used, however, in making new milling cutters from scrap materials. Slots are machined in a piece of mild steel for a hub blank. The outside corners of the slots are chamfered. Scrap high-speed milling cutter blades, cut off to the desired size, are pressed into this hub. The parts to be joined are laid flat on a metal bench. Chamfered edges are prepared with flux. Finally, with the torch applied to the end of the rod, it is run around the junctures of the blades and the slots.

For reclaiming a cracked slitting saw, a V-slot is chamfered down to a hairline. Here the heat is applied from the center outward. In every case it is applied in such manner as to keep it away from the cutting edges as far as possible.

The welder, in all this work, uses a small, feather-edge carburizing flame.

The tool reclaiming department at Tractor Works is in position to know how the perishable tools reclaimed by the low-temperature brazing method are standing up. All orders from the stores department for the thirty-one production departments using cutting tools go first to the tool reclaiming department to be filled if possible with reclaimed tools. Whenever the tool reclaiming department sends an order to the welding department to fabricate a worn tool by brazing for a given production department, the latter is charged with the cost of the reclaimed tool. The production departments would complain if the reclaimed tools did not give satisfaction.

Milling cutters and other perishable tools made or reclaimed by low-temperature brazing have been found to last as

You can make HEAVY FORMING CUTS on

OSTER

No. 601 "RAPIDUCTION" SIMPLIFIED TURRET LATHES

An unretouched photograph of an Oster No. 601 machine making a heavy forming cut. Note absence of chatter as demonstrated by the clean cut appearance of the stock.

It takes a smooth, even flow of power (and plenty of it!) to make heavy forming cuts with absence of chatter, as illustrated in the above view. Batteries of Oster No. 601 machines are doing it on 'round-the-clock production schedules!

Equipped with *worm drive,* the smooth power of the No. 601 machine is obtained with the hardened and ground steel worm, which, like the spindle, is mounted in ball bearings.

(Where high speed work is required on small diameters and non-ferrous metals, the No. 601 is equipped with *direct drive* from motor to spindle. Spindle speeds up to 3000 R. P. M. are obtainable.)

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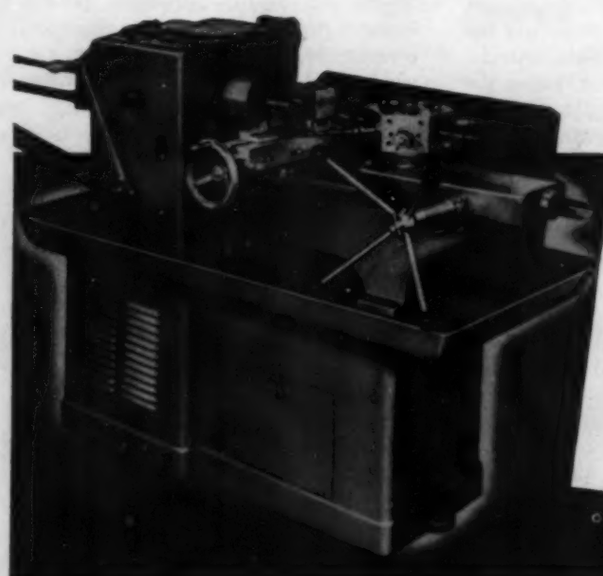
Exclusive of tooling, the Oster No. 601 costs less than $2000.00 F. O. B. factory. Orders placed *NOW* will be scheduled for delivery in less than 90 days from date of order.



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Rush, by return mail.....copies of Catalog No. 27-A which contains full description and detailed illustrations of No. 601 Turret Lathe.

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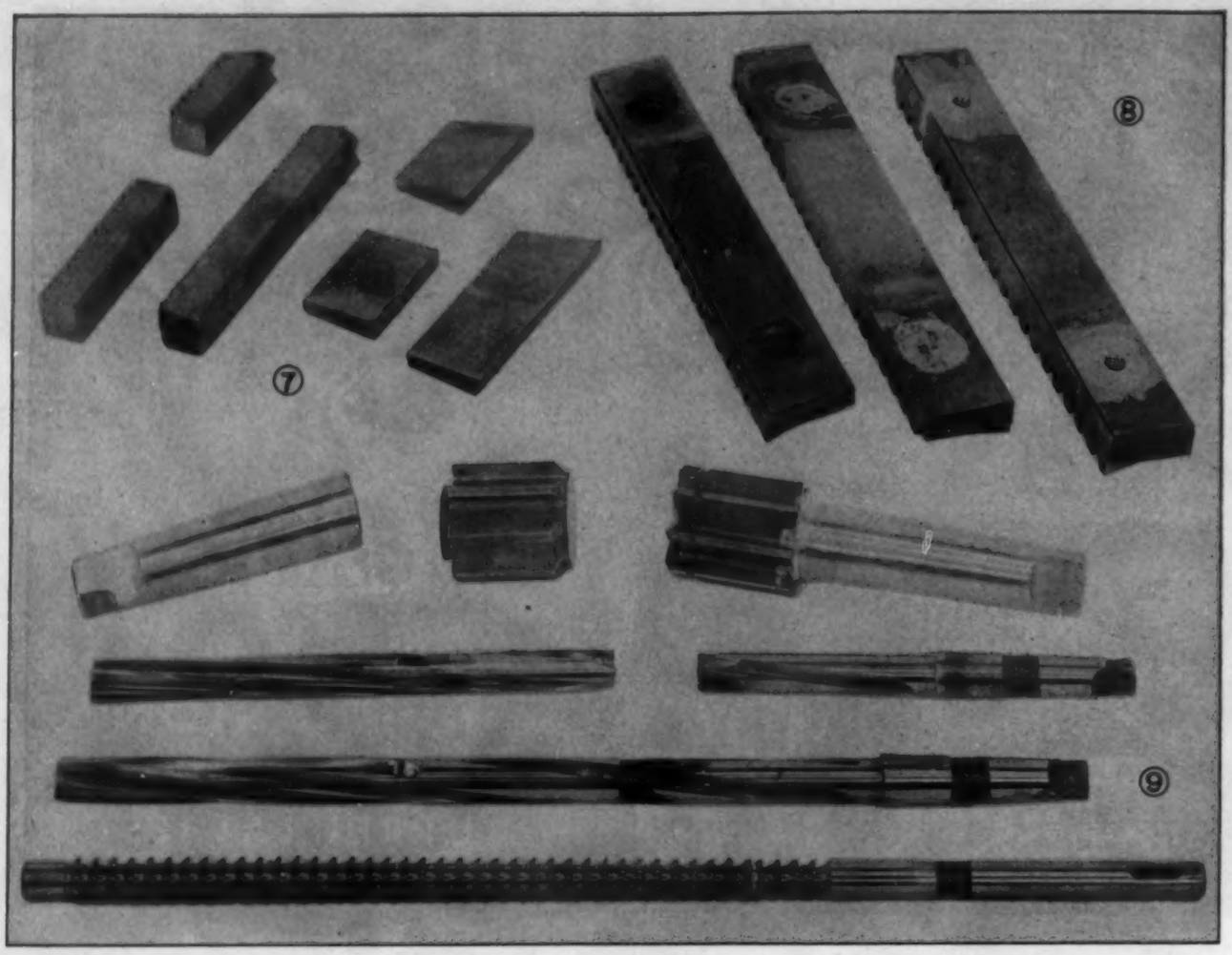


Fig. 7—Mild steel ends are brazed on short turning tools to extend their life

Fig. 8—Tapped holes in flat surface broaches are filled up with braze metal, redrilled and tapped

Fig. 9—Broaches, reamers and cutters are made from odd parts and broken ones repaired by low-temperature brazing. These are typical jobs

long as there is any grinding stock left in them. This applies to the regular 18-4-1 type of high-speed steel and to other types, although their reactions to heat are somewhat different. Even the now popular "moly", in which there is a reduction of tungsten and an addition of molybdenum, is suitable for low-temperature brazing since the addition of the molybdenum has no appreciable effect on this method.

The reclaiming of cutting tools at Tractor Works, as in the entire tool salvage program of Harvester, has been acknowledged as an emergency measure. It has made it possible for Tractor Works, even though over 60 per cent of its tools are specials, to go forward with vital war work which has completely replaced its production of farm tractors, replaced its production of gas and diesel power units, and greatly increased its production of Track-Tractors. And in addition it has resulted in a substantial cost reduction, for cost figures have been kept accurately.

For the current fiscal year, tool reclamation is resulting in a saving of 14.5 per cent of the total invoice value of all cutting tools used here. The basic features of the formula by which this figure was arrived at are as follows: To the amount expended for new cutting tools, add the value of the reclaimed tools, namely, their cost if purchased new, minus the cost of labor for reclaiming plus a specific labor burden cost. This means that the saving on an individual tool is much higher than the 14.5 per cent for the grand total of all tools.

As an example, take a side-milling cutter which if purchased new would cost $23. A scrap piece of bar stock and 18 scrap high-speed milling cutter blades would be used as materials for reclaiming. The operations called for are: Machine the hub with radial slots, shape up the scrap blades by grinding, braze the blades in place in the slots, grind cylindrically and on the side, backoff. The costs would be: Salvage materials, $1.25; labor, $6.50; burden, @ 65% of labor, $4.23; total, $11.98; saving, $23.00 minus $11.98 or $11.33. This is nearly 50 per cent. In this calculation, burden includes the materials used in low-temperature brazing, such as welding gas, welding rod and flux; also tool room overhead.

It is not surprising, therefore, that Mr. Philips, superintendent of Tractor Works, counts on low-temperature brazing as a permanent factor in that plant's method of holding down costs as well as in getting tools in a hurry.

Plant men of other companies will soon have an opportunity to see a movie showing low-temperature brazing at the Harvester Tractor Works. This film, one of several made at the request of the Industrial Salvage Section of the War Production Board, is among those to be circulated by the American Society of Mechanical Engineers. Its title is well chosen. It is "Save Those Tools." Any machinist or tool man will profit by seeing it.

CORRECT SET-UP

The accuracy of a shaper cutter is no better than the accuracy with which it is mounted in the machine.

1. Be sure there is no play between shaper cutter and arbor.

2. Check concentricity with an indicator graduated to ten-thousandths. Maximum runout should not exceed 0.0005.

3. If runout exceeds 0.0005 in., unclamp and rotate the spacing collar—these collars usually having slight errors in parallelism.

4. Helix errors in tooth surfaces may be due to wear in ways guiding the spindle in the helical path.

5. When clamping the cutter in position, use the minimum number of spacing collars possible.

Additional helpful information is available in a booklet on gear shaping and shaper cutters. Ask for Bulletin GS-42.

SHARPENING

A sharp cutter will cut faster with less power and wear. It will produce more accurate work with better finish.

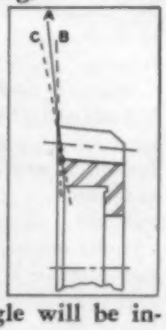
1. Use a soft wheel with medium grain. Keep wheel clean as a glazed wheel may crack cutter teeth.

2. Grinding too much metal at a time may cause heat-checks in the cutter teeth.

3. Never grind a cutter except on its face. "Touching up" sides or ends will alter the tooth form and spoil the cutter.

4. Be sure the cutting face is true with the bore. If not, cutting action will be irregular and tooth form changed.

5. Always grind to the correct face angle ("A" in drawing) as marked on the cutter.



If the angle is decreased ("B") the pressure angle will be changed and cutting efficiency decreased. If the angle is increased ("C") the cutting efficiency may be increased but the pressure angle will be incorrect.

CHECKING

Gear checking equipment should be such as to disclose the *exact nature* of the inaccuracy producing unsatisfactory gears.

1. Incorrect pitch diameter usually means machine-setting error or heat-treat distortion. Check with pins or balls.

2. Variable backlash is usually due to eccentricity. Use a master gear in preference to an indicator, if possible. Also check cutters and their mounting for eccentricity.

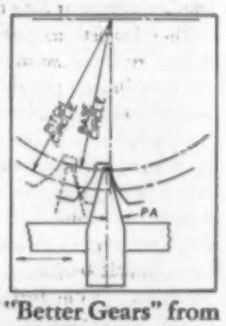
Michigan Sine-Line Lead Checker

3. Tooth form and spacing should be checked together, since the former is not dependent on depth at which measurement is taken.

Michigan Sine-Line Involute Checker

4. Check the spiral lead rather than the helix angle, since the former is not dependent on depth at which measurement is taken.

Master Rack Tooth Simplifies Checking



5. Get a copy of "Better Gears" from Michigan Tool Company for detailed information on locating gear troubles.

MICHIGAN TOOL COMPANY

7171 E. McNICHOLS ROAD . . . DETROIT, U. S. A.

Film Refining Process OF STEELMAKING

A FAST and continuous method of making good and clean steel and alloy steels of exact composition and in large tonnage is much desired and has been the object of many researches. A simplification of the steelmaking operation to make its control certain and automatic is also much needed.

The film-refining process—something new and original in the long history of steelmaking—makes the foregoing advantages available to the production of all steels and alloy steels in commercial use.

Steelmaking is a removal *by oxidation* of certain unwanted components, such as: Silicon, manganese, carbon, sulphur and phosphorus existing in a charge or bath of molten iron or molten steel. It also involves obtaining the refined steel as free as possible from oxides and other inclusions both solid and gaseous. The nature and amount of these inclusions constitute the main difference between bessemer, open-hearth, and electric steels, as now produced, affecting the use of these steels and even their sales price.

The fastest method of oxidation is by a blast of air whose oxygen oxidizes the silicon, manganese and carbon from the molten iron. This is effected both in regular bessemer converters and in smaller tropenas side-blow converters.

The largest tonnage of steel is produced under a slower method by which the oxidation of the unwanted components such as silicon, manganese, carbon, sulphur and phosphorus is obtained by iron ore or iron oxide (scale) and limestone brought in contact with the molten iron in the form of molten slags. This slag refining operation is effected in open-hearth furnaces and in electric arc furnaces. The oxidizing reactions between molten slags and the above components are obtained in a selective order and within certain temperature limits. These reactions are instantaneous at the surface of contact between iron and slag with instant chemical modification of both the iron and slag. However the molten slag covering only the top surface of a deep bath of molten iron or steel, the time required for full oxidation of the metalloids, is generally large, on account of the slow diffusion through the deep bath. During this time the composition of the molten iron or steel bath and floating slag, continuously change with danger of reversibility, in which case, one or more of the metalloids are reabsorbed from the slag by the molten iron or molten steel. Even with the help of repeated chemical analysis a long experience is essential to properly direct this method of steelmaking. Most of the oxidizing reactions between the molten iron and the molten slag are exothermic and consequently release a large amount of heat to the molten metal and the furnace containing it. However, on account of the radiation losses during the long time required, heat has to be supplied to the furnace throughout the refining period, even after the slag forming materials have been melted.

Employs Both Methods

These two methods of oxidation are used under the film-refining process to oxide the previously mentioned unwanted components. The same chemistry is also used but it is effected under an entirely new set of physical conditions making the refining operation simple, fast, complete and effective while it is kept under exact control. Furthermore, the process being continuous, the rate of production is larger than with existing furnaces.

This new method offers many economical advantages including a small investment for equipment; considerable reduction in the cost of production by savings in the amount of fuel, power, refractories and labor, as now required; and cheap and efficient production of steel by small size plants.

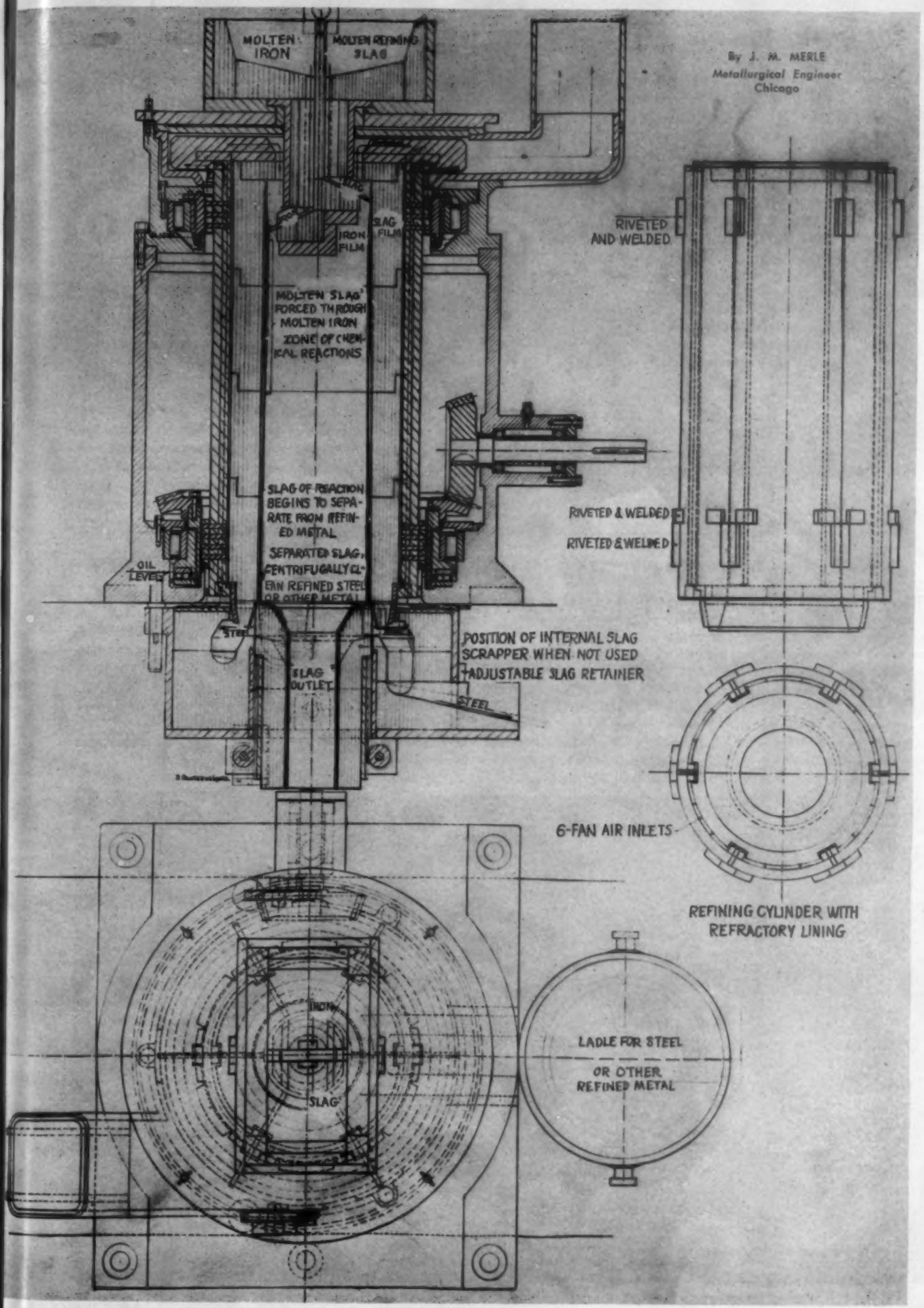
It is the only method as far as known which makes possible the following operating conditions and technical advantages:

1. Creates, controls and maintains surfaces of contact between the molten metal to be refined and the required amount of air or of molten slag of the right composition and at the right temperature, in the form of superimposed films of constant thickness, until the chemical reactions have been completed.
2. Mechanically removes the slag from contact with the refined molten steel as soon as the oxidizing reactions have been effected and effectively prevents chemical reversibility.
3. Makes possible full oxidation of all metalloids and consequently permits production, at low cost, of purer ingot iron, as well as low-carbon alloy steels.
4. Effectively separates under centrifugal action, from the finished refined steel, not only entrapped slag but most of the oxides and gas inclusions, which at present remain occluded in steels made under other processes and consequently makes possible the obtention of cleaner and better steels than are now produced.
5. Fully uses the heat released by the exothermic oxidizing reactions to save fuel.
6. Refines steel continuously and makes available for casting purposes a continuous supply of clean steel, at the rate of 1 to 3 or more tons per minute, which can be cast into ingots or other castings. The handling is easier and more convenient than a bulk heat of 100 or 200 tons delivered in a ladle and which has to be cast within 30 minutes.
7. Permits a complete check-up and adjustment of the whole steelmaking operation, by a short test run lasting 3 to 4 seconds. In that short period, 200 to 300 pounds of molten iron will be transferred into steel, in a film-refiner by means of an air blast or an oxidizing slag. This steel can be collected and cast into ingots or test bars to determine the exact composition and physical properties. The used slag can also be collected and its exact composition determined. The foregoing information will indicate if any adjustments are necessary in slag composition and operating temperature. The whole supply of molten iron will subsequently be treated with a slag giving steel of the exact composition wanted, as test-proven by above short run.
8. Mechanically creates and maintains constant refining conditions to a whole supply of molten iron or molten steel.
9. Permits to reproduce and maintain identical refining conditions on any amount of molten iron or molten steel and to refine it into finished steel, entirely uniform in compositions, cleanliness and temperature.

The steelmaking operation, in present practice, is effected on a batch of molten iron or steel of a few tons and up to 200 tons, presenting a small and limited surface of contact with the molten slag, while the molten metal bath may be 18 to 36 inches deep. Speed-up methods using molten slags have been tried with an amount of success.

Under the film-refining method, the surface of contact between molten metal and molten slag is continuously created, controlled and kept uniform to make it

Plan view of refining machine which can be built for vertical or horizontal operations and for ferrous, nonferrous and alloy metals


By J. M. MERLE
Metallurgical Engineer
Chicago
MOLTEN IRON
MOLTEN REFINING SLAG
ARC
SLAG FILM
IRON FILM
MOLTEN SLAG FORCED THROUGH MOLTEN IRON ZONE OF CHEMICAL REACTIONS
SLAG OF REACTION BEGINS TO SEPARATE FROM REFINED METAL
SEPARATED SLAG, CENTRIFUGALLY CLEAN REFINED STEEL OR OTHER METAL
OIL LEVEL
STEEL
SLAG OUTLET
STEEL
RIVETED AND WELDED
RIVETED & WELDED
RIVETED & WELDED
POSITION OF INTERNAL SLAG SCRAPPER WHEN NOT USED
ADJUSTABLE SLAG RETAINER
6-FAN AIR INLETS
REFINING CYLINDER WITH REFRACTORY LINING
IRON
SLAG
STEEL
LADLE FOR STEEL
OR OTHER REFINED METAL

many times greater than in present furnaces. As a result, the rapidity of the process becomes understandable. As an example, refining and finishing a 100-ton heat in an open-hearth furnace may require about 4 hours and the bath of metal may be 30 inches deep. In a Merle refiner, all this molten metal would be formed into a continuous film or layer about 3/16-inch thick, with a layer of molten slag, at proper temperature formed on both sides and as the chemical oxidizing reactions are completed, the refined steel would be continuously separated from the slag and collected. The capacity of production of such film-refiners is 1 to 3 tons per minute or more if required. In the film-refiner the surface of contact between the molten metal and molten slag is 30 : 3/32, or 320 times greater than in the open-hearth furnace and as the time required to complete the oxidizing reactions is a function of the surface contact when 4 hours or 240 minutes are required in the open-hearth furnace, the time required in a film-refiner is only 240 : 320 or less than one minute. This explains the extreme rapidity of operation of the Merle film-refiners. In a bessemer converter where a large surface contact is also created, 50 tons of metal is blown in 20 minutes, which is 2½ tons per minute, although available only when the whole charge has been blown.

Type of Machine Varies

The film forming and refining operations can be carried out in various types of machine. Films of molten metal and slag can be formed over the cylindrical surface of a refractory roll, or over the surface of two rolls operating like a rolling mill. The film forming and refining operation can also be carried out by forming both the molten metal film and molten slag film or films against the inside surface of a revolving refractory cylinder with proper conicity to control a definite rate of travel of both films which will insure the required surface and time of contact for complete chemical reactions between the films before these materials are separated and collected. This centrifugal method is preferred for steelmaking because it makes available all the technical advantages heretofore mentioned.

Film refiners can be designed and built for any desired rate of production. They can be used for all kinds of refining operations on both ferrous and nonferrous metals and alloys. Whatever is the capacity or the use, the general construction is as follows:

These refining machines for steel are similar to centrifugal pipe casting machines. They can be built for vertical or horizontal operation, whichever is more suitable to handle the specific production to be carried out.

The unit includes a cast-iron or steel frame holding two steel rings spaced according to the length of the refiner cylinder used. The two rings have spline slots to fit the spline ribs or bars of the refiner cylinder. Radial and thrust roller bearings are fitted between the frame and rings insuring free rotation of the rings under full load conditions. These bearings are dust-sealed and kept running

Baldwin Southwark Builds 3500-Ton Extrusion Press

DESIGNED for both direct and indirect extrusion, this powerful press, below, is one of five 3500-ton extrusion presses recently completed by Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia. It is equipped with a 250-ton hydraulic billet shear, two coarse-tooth saws driven by 40-horsepower motors and a billet handling device to take the heated billet from the furnace and deposit it in front of the extrusion container.

The press' main cylinder casting weighs 200,000 pounds, the machine proper 1,000,000 pounds and complete with auxiliaries 1,500,000 pounds. It is of the 4-rod type, with forged tension rods 16 inches diameter.

The 59-inch diameter ram, under 3200 pounds per square inch working pressure, will handle billets up to 24 inches in diameter and up to 36 inches long. Its working stroke is 7 feet. Main ram is rapid traversed to working position under a low pressure of 200 pounds. The press is operated from two 500-horsepower multiple plunger pumps in connection with the hydro-pneumatic accumulator system designed for 3500 pounds per square inch hydraulic pressure.

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in a bath of oil by a special oil circulating pump built in each ring and operating when the cylinder is rotated. Continuous air circulation keeps the bearings cold under continuous operation of the machine. A bevel gear is keyed and bolted to one of the two rings and geared to a driving pinion whose shaft can be directly coupled to an electric motor or can be belt driven. The power required is small and generally less than 10 horsepower for most refiners.

The refining cylinder is made of a seamless steel pipe in most machines—or rolled and welded plate in larger machines. This steel cylinder has riveted and welded outside two sets of six short driving teeth or bars fitting the spline slots of the two rings with ample clearance permitting free expansion and contraction of the steel cylinder. It also has short riveted and welded steel segments carrying the weight of the refining cylinder to the supporting ring or rings. Inside of the steel cylinder, three or six keys or bars are riveted to it and drive the refractory lining. The fully assembled refining cylinder can be set or removed from the machine, in an instant, without touching the whole driving mechanism or removing a bolt.

The refractory lining will fit inside the steel cylinder with enough clearance between cylinder and driving keys to allow for free expansion and contraction of the refractory. Usually a peripheral space will be left between steel cylinder and refractory cylinder through which air will be drawn or circulated to reduce the heat radiation of the refractory to the steel cylinder. The refractory refining cylinder will be made to suit the refining requirements—basic or acid operation—or it will be a neutral refractory material. The lining should be made preferably of a molded and baked cylindrical brick, either in one piece or in fitted cylindrical blocks. Sintered magnesia cylinders can be supplied, also cylinders of Mullite, which is neutral to the action of molten iron and steel and most molten slags. The material used should have a softening point above 3200 Fahr. and a higher melting point. Refractory linings also can be made with refractory cements properly rammed and dried, such as, magnesite, periclase, zieconia, chromite, ganister sand, etc., with proper bonding.

Besides the refractory lining, the steel cylinder has a steel cover plate with central hole large enough to admit the streams of molten iron or steel and molten refining slag. In vertical machines the steel cover plate will have fan blades welded to it and operating in the casing of an exhaust fan. This exhaust fan will operate when the machine is rotated with a triple effect. 1. It will draw a stream of cold air between the frame and rotating cylinder, thus cooling the bearings. 2. It will draw another stream of air between the steel cylinder and refractory cylinder, as indicated previously. 3. It will draw the hot gases produced by the chemical oxidizing reactions within the refractory cylinder and exhaust both air and gases through a vertical stack.

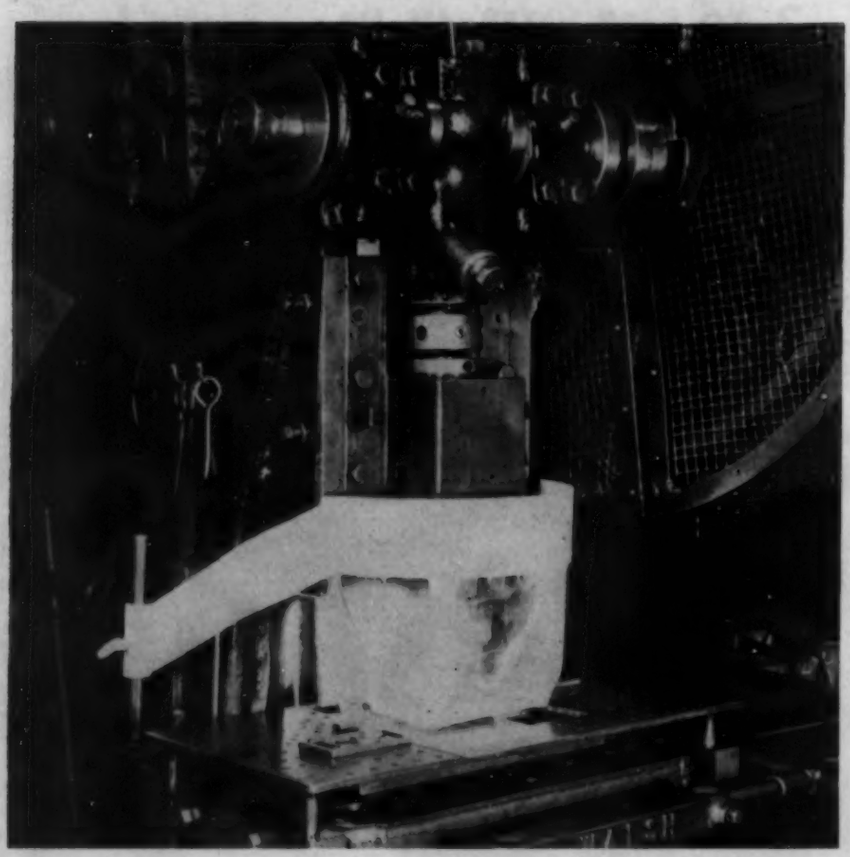
Machine Weighs 2500 Pounds

The total weight of the rotating cylinder, in machines of 1 to 3 tons capacity per minute, is approximately 2500 pounds depending on the refractory material used. The weight of molten iron or steel plus slag carried by the rotating cylinder while it travels through it is small and uniform during the whole operation. For 1 ton per minute operation, this total weight will be approximately 45 pounds; for 2 tons per minute, 90 pounds; and, for 3 tons per minute, approximately 125 pounds. These molten materials, steel and slag, only circulate through the rotating cylinder and the power load hardly varies, whether the machine is run empty or operating.

Comparing the weight of molten iron or steel to the weight of the refractory lining supporting it, the proportions are: Four per cent for 1 ton per minute capacity, 7 per cent for 2 tons per minute and 10 per cent for 3 tons per minute capacity. Comparing the load of molten steel per square inch to load on hearth in open hearth and electric furnaces, where the load is from 6 to 9 pounds per square inch, a satisfactory situation also exists. In the Merle refiners, the load is made up of actual weight of the steel film plus centrifugal acceleration exerted upon it. However, at 300 revolutions per minute, the load is only 0.54-pound per square inch and at 600 revolutions per minute this load is 2.14 pounds per square inch and these speeds are sufficient and practical for operation. To attain a load of 9 pounds per square inch, the refining cylinder would have to be rotated at 1200 revolutions per minute, which is not required for practical

(*Please turn to Page* 131)

"GLASS" GUARD FOR PUNCH PRESS OPERATIONS



FLEXIBLE glass panels act as a guard on this punch press operating in the Baltimore plant of Westinghouse Electric & Mfg. Co. Not only does it provide complete protection to the worker, but it has no moving parts to confuse his vision. Guard is mounted on a pin bolted to left side of press frame. It may be lifted or lowered on this pin and held in any desired position by a thumb screw. Material fed into die just clears bottom of guard frame, allowing no room for operator's hand to be inserted

"BACKBONE" GIVES THEM RANGE AND HITTING POWER

"BACKBONE" GIVES THE MILWAUKEE ACCURACY AND PERFORMING POWER

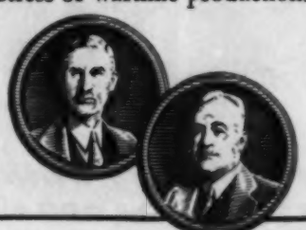
Lobbing shells, hour after hour, demands plenty of "backbone" in the big guns that are assigned the task of making enemy positions too hot to hold.

Milling tough metals and alloys at high speeds and to close tolerances, hour after hour, isn't quite as spectacular, but the machine that handles the work must have similar "backbone" to withstand the ceaseless strain and vibration.

In milling machines, *rigidity* — an indispensable quality in any machine tool — originates in the column, the backbone of the machine. The column of a Milwaukee Vertical Milling Machine has been engineered for the proper distribution of metal to assure the maximum stability.

A look inside this husky backbone would reveal a horizontal wall, dividing the column into a double box-section. This provides an unusually rigid structure.

It is features like this which have enabled Milwaukee Milling Machines to do more than the "usual" under the stress of wartime production.



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Milwaukee MACHINE TOOLS

OEM Photo by Palmer

Steel Man with a Mission

. . TO KEEP THE ELECTRIC FURNACES MELTING

ALL of us—men or women—on the job or off it—are people with a mission these days. This war makes common cause for every one and spares no one.

The maintenance-man's job, atop an Allegheny Ludlum electric furnace, is no less essential than that of the crew who operate the furnace, nor than that of the fabricators who use the stainless, tool, valve or electrical steel it produces. Total war demands maximum cooperation on the supply fronts as well as the fighting fronts, and it asks also that every last bit of manpower and materials be used to maximum advantage.

Boiled down to a very few words, that simply means: *no waste—everybody help.* How can we help *you* to produce better and faster for war; to stop the loopholes of waste; and to plan your course in post-war production?

For your designers and technicians, complete and certified laboratory data on all Allegheny Ludlum alloy steels are available in "Blue Sheet" form. For your engineers and production men, our "Handbook of Special Steels" contains comprehensive and valuable information; and our "Elementary Discussions," covering Tool and Stainless Steels were developed particularly for training course and student use.

Write for any printed material that will help you; and if you need personal assistance, the services of our Technical Staff are at your command.

Allegheny Ludlum
STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA

A-8711 . . . W & D

By THOMAS A. FRISCHMAN
Chief Metallurgist
Axle Division
Eaton Mfg. Co.
Cleveland

A Metallurgical Study of Some . . .

NE (National Emergency) ALLOY STEELS

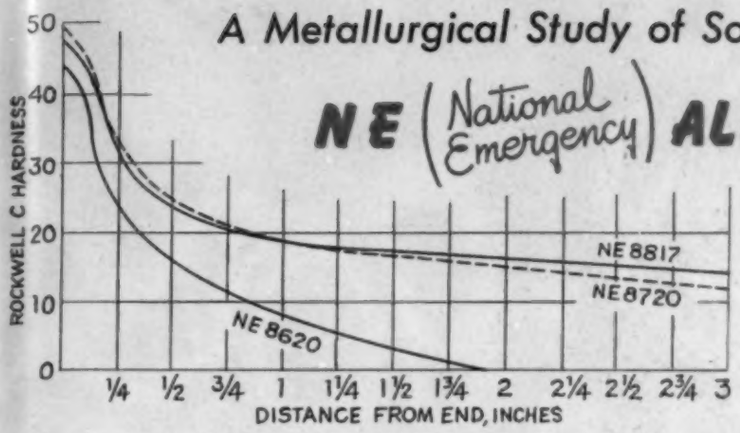


Fig. 1—End quench characteristics for steels shown under Table IV

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41, p. 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 23, p. 96.

For latest revised list, see STEEL, Nov. 9, p. 96.

For reports from users of NE steels, see STEEL, Nov. 16, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112.

FOR MANY APPLICATIONS the National Emergency steels are rapidly becoming the steels of the hour. They are nevertheless still in the neophyte stage to many users, and just when some familiarity with them is being attained, as in the NE 8000 series, an NE 9000 series is being released. No doubt some wonder whether stabilization of chemical analysis is a luxury of prewar days—and it might well be, because the supply of critical materials is not too accurately predictable.

There was a time when the high alloy content of steels furnished reserve endurance when some anomaly—perhaps in steel quality, design, machining or heat treatment—occurred, and the parts so made gave satisfactory service regardless. With the reduction in alloy content, this class of production might conceivably suffer in applying the raw materials. However, there were many products manufactured in prewar times from steels more highly alloyed than was necessary for the imposed service conditions. Other factors such as availability, standardization, arrangement and type of manufacturing equipment were involved in the choice of the so-called "richer" steel. For instance SAE 2515 steel can be annealed to a lower hardness than SAE 4820 steel on a relatively fast cycle, or in other words it can be taken out of the furnace sooner than the SAE 4820 steel. Likewise SAE 2515 steel is rarely direct quenched from the carburizer, whereas SAE 4820 is. Thus the type of furnace equipment often influences the choice of the steel.

Where the prewar steel used might have been highly alloyed with nickel, chromium and molybdenum, either alone or in combinations with each other, operating under conditions of high stress with little safety factor, the new NE steels such as the NE 8000 and NE 9000 series might not always work out as satisfactory replacements without making design changes or placing some restrictions on the use of the part in service. However, as time passes there will be brought to light many instances where better steels than necessary have been used, and it is here the adoption of the NE steels will make the most impressive showing. At any rate the steel user today must know now, more than ever before, the limitations of the mate-

(*Please turn to Page* 119)

TABLE I—Carbon Concentration in Pot-Carburized Samples Carburized at 1680 Degrees Fahr.; Cooled in Lime; In Per Cent

Cut No.	Depth Below Surface (In.)	NE 8620	NE 8720	NE 8817	SAE 2315	AISI 6120	AISI 4027
1	0.000 -0.0025	1.18	1.22	1.24	1.03	1.74	1.04
2	0.0025-0.005	1.15	1.19	1.16	1.01	1.40	1.09
3	0.005 -0.010	1.12	1.12	1.11	0.94	1.09	1.07
5	0.020 -0.025	0.86	0.88	0.86	0.82	0.91	0.91
7	0.045 -0.050	0.40	0.46	0.46	0.46	0.52	0.56

TABLE II—Comparison Between Carburizing Characteristics for Different Carburizing Media
Samples Carburized Simultaneously in Each Media Carbon Content

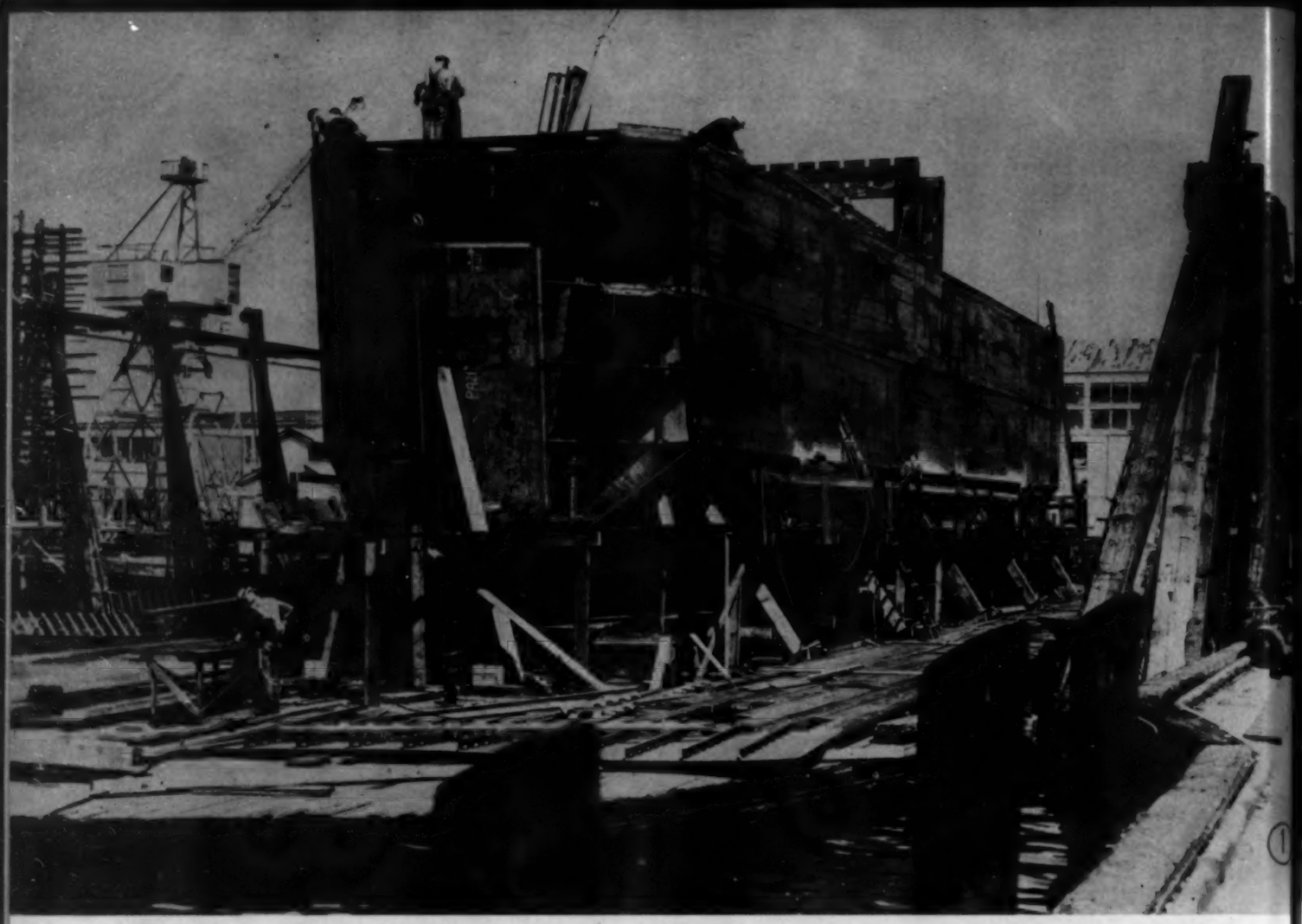
Cut No.	Depth Below Surface (In.)	Pot Carburized 1700° Fahr. NE 8720	Pot Carburized 1700° Fahr. SAE 4620	Gas Carburized 1650° Fahr. NE 8720	Gas Carburized 1650° Fahr. SAE 4620
1	0.000 -0.0025	1.19	1.16	1.28	1.08
2	0.0025-0.005	1.17	1.11	1.06	1.03
3	0.005 -0.010	1.13	1.10	1.04	0.97
5	0.020 -0.025	0.84	0.80	0.78	0.69
7	0.045 -0.050	0.38	0.38	0.36	0.30
Total Case Depth by Brinnell Microscope		0.058	0.58	0.060	0.060

TABLE III—Relation Between Case Depth and Hardness, Direct Quenched and Reheated NE 8620 Steel, All Drawn at 300° F.

Case Depth	1700° F. Carburize	Treatment	Rockwell C Hardness Case	Core
0.040	pot	Direct quench	62	29
0.040	pot	Reheat 1525° F.	65	28
0.068	pot	Direct quench	58	32
0.066	pot	Reheat 1525° F.	64	31
0.052	gas	Direct quench	59	30
		NE 8720 Steel, Drawn at 300° F.		
0.040	pot	Direct quench	60	39
0.040	pot	Reheat 1525° F.	64	40
0.068	pot	Direct quench	56	40
0.068	pot	Reheat 1525° F.	63	41
0.052	gas	Direct quench	57	41
		NE 8817 Steel, Drawn at 300° F.		
0.040	pot	Direct quench	61	35
0.040	pot	Reheat 1525° F.	63	33
0.066	pot	Direct quench	57	39
0.062	pot	Reheat 1525° F.	64	36
0.052	gas	Direct quench	57	35

TABLE IV—Chemical Composition of NE Steels Shown in Table III

Steel	C.	Mn.	P.	S.	Si.	Ni.	Cr.	Mo.
NE 8620	0.19	0.73	0.016	0.022	0.26	0.46	0.48	0.23
NE 8720	0.21	0.82	0.016	0.021	0.28	0.60	0.49	0.26
NE 8817	0.19	0.84	0.015	0.015	0.29	0.48	0.52	0.33



WELDED CAISSONS

For Naval Dry Docks

By Capt. C. A. TREXEL (CEC) USN
Director of Planning and Design
And
A. AMERIKIAN
Designing Engineer
Bureau of Yards and Docks
Navy Department
Washington

A DRY DOCK is generally described as a water basin with a removable gate, which provides a dry berth for maintaining, repairing or building ships. The history of its growth and development is closely allied with that of ships because of the nature of the services which it renders.

Dry docks are important to the maintenance and operation of a naval fleet. While some service to smaller craft is rendered by marine railways, the repairs to major vessels must necessarily be carried out in floating dry docks. The importance of such shore facilities, particularly in time of war, is obvious, for without them, ships would become immobile and useless because of fouling of bottoms, damaged propellers or rudders. Too, many a battle-damaged ship would be lost if it were not possible to repair it in a dry dock.

Dry Dock Closures: The entrance closure is an integral part of a basin dry dock. Mobility is required for clearing the entrance quickly to facilitate movement of ships in and out. Strength is an obvious requirement for the structure must withstand the external water pressure when the dock is pumped out.

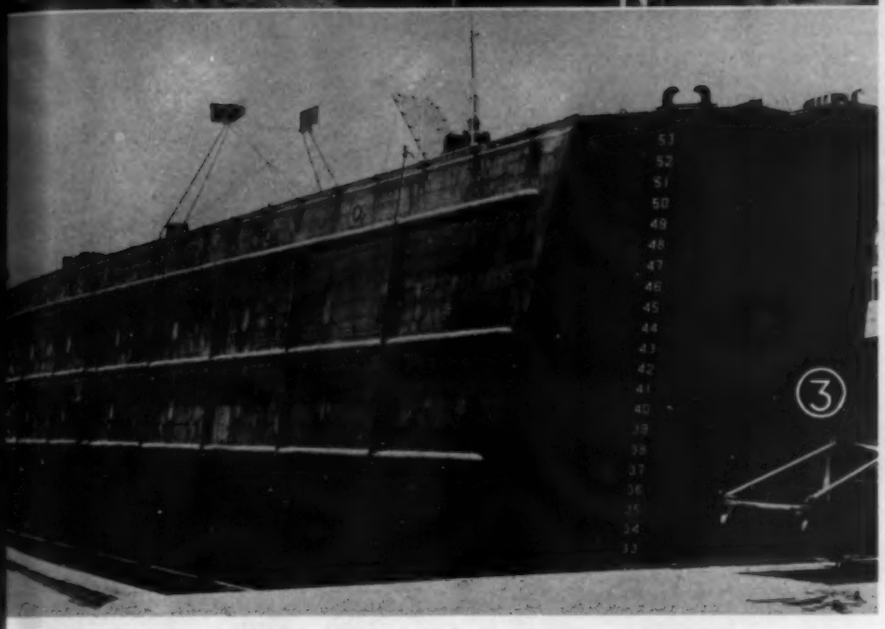
Mobility may be provided by hinged miter gates, similar to canal lock gates; sliding or rolling caissons; or removable floating caissons. Gates are employed in many European dry docks. The sliding type of caisson, which is drawn into a recess at the dock entrance to permit the entrance or removal of a ship, is a favorite at English and British colonial dockyards. In American practice, the floating caisson is the most commonly used form of dry dock closure.

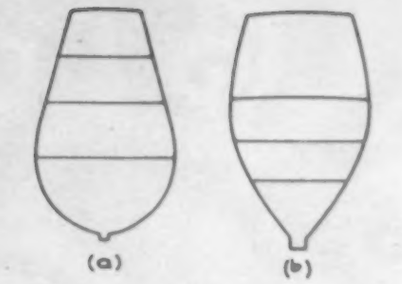
Floating Caissons: As the derivation of the word would indicate, a caisson is essentially a box. This box is composed of a system of interior framing and an enveloping skin plating. The interior framing, in turn, consists mainly of a series of trusses or girders, spanning longitudinally and transversely. The skin plating, which is of water-tight construction, is supported by a set of girts

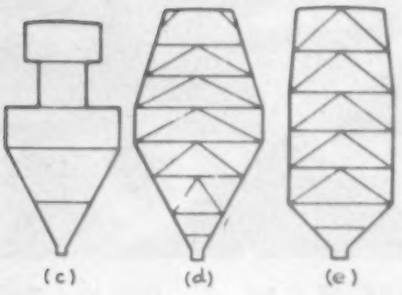
Fig. 1—Parts of stem and end framing going together as caisson is assembled

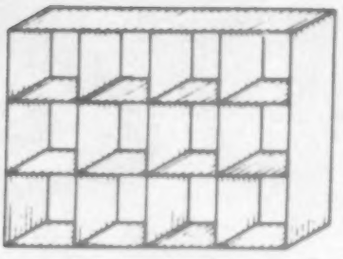
Fig. 2—Partially assembled caisson, showing sections of main transverse framing

Fig. 3—First all-welded caisson complete and afloat. Beam 22 feet, depth 54 feet, length 150 feet









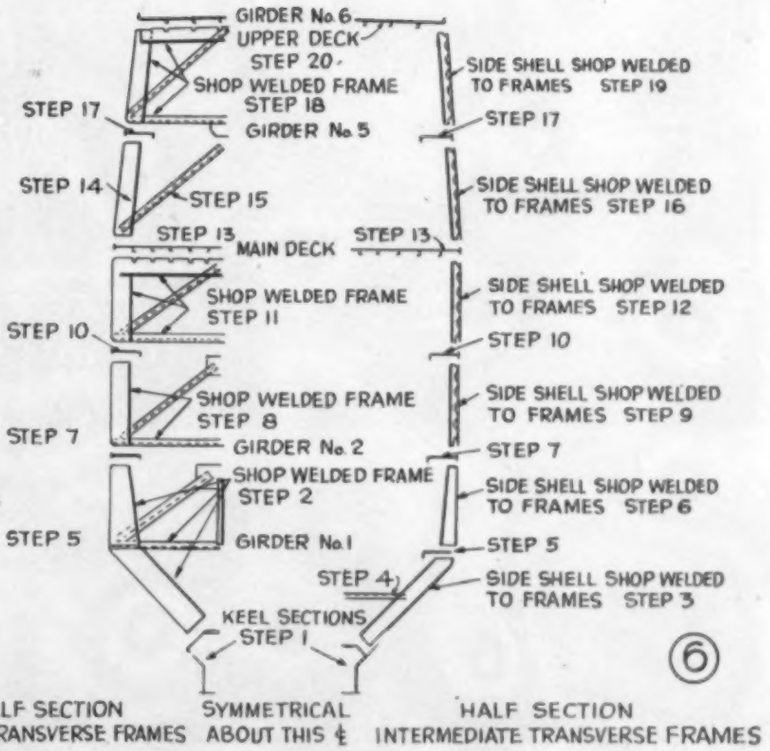


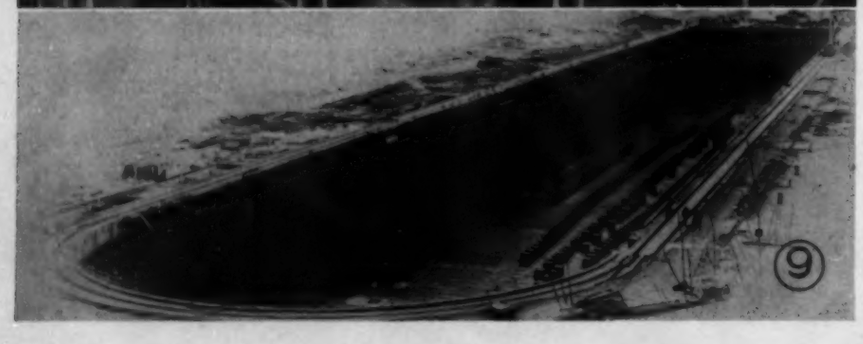
Fig. 4 — Typical cross-sectional outlines of dry dock caissons shaped as (a) bulk, (b) ship, (c) hydro-meter, (d) barrel, and (e) box. The latter is the one utilized here

Fig. 5—Interlocking box sections as shown here form main framing arrangement of caisson, with shell plating removed

Fig. 6—Erection procedure of shop subassemblies of welding caisson. Erection notes: Fabricated keel, stems, bulkheads, breast hooks and diaphragms shall be set up as work at midship section progresses, care being taken to maintain molded lines. All frames, girders, etc. shall be held by tack welds before full weld is applied. After all interior framing is fully welded, longitudinal welds for shell plates and decks shall be made. Vertical welds in shell and transverse welds of deck butts or laps shall be made last

---

From paper winning first grand award of $13,700 in the 1940-42 Industrial Progress Award program sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland. Award papers showed a possible saving of $1,825,000,000, including 7,000,000 tons of steel and 153,000,000 man-hours of labor available by application of arc welding.



or stringers forming secondary framing.

The cross-sectional outline of a caisson is determined from the conditions of stability and minimum draft in flotation and the necessary strength when in the seat and subjected to the unbalanced water pressures. As in the case of ships, the cross-sectional outline has undergone considerable change. In the early days of naval construction, when labor was inexpensive and the time element not so pressing, the general tendency was to choose curved outlines of what would now be considered doubtful efficiency.

Some of these outlines are shown in a, b, c and d of Fig. 4, representing, in that order, the bulb, ship, hydrometer and barrel-shape types of caissons formerly used. In e is the modern, simple, yet efficient, box-type framing outline used by the Bureau of Yards and Docks, Navy Department, since 1940. The latter follows bridge practice rather than the more costly orthodox ship construction used in former caissons.

In the earlier days of shipbuilding

Fig. 7—Top view of partially assembled caisson, showing some details of interior framing

Fig. 8—End view of partially completed caisson, showing 12 welding operators working simultaneously on six different levels welding three strakes of shell plating. Four more are at work inside, welding butts at two decks. Note special scaffolding made of welded pipe sections clamped together

Fig. 9—View of modern dry dock, with caisson in the background. Caisson is end-gate, must seal dock watertight to be effective

DoAll

THE TIME STRETCHER

Left—"Drill Jig for gun mounting cut in 1½ hours by the DoAll. Diameter 35", thickness 1¼". Due to accuracy required, the plate could not be torch cut. The only other way to do the job was to slit it on a miller or part it in a planer. Our DoAll solves these problems in one-quarter the former time."

MAKES 4 MAN HOURS OUT OF 1

Below—Special Jig Clamp used to hold a gun sight casting. "A three-dimensional cutting job 3¼" x 3¼" x 6". The usual way was to shape it, requiring at least eight hours. DoAll cuts it in 2 hours."

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THE WORLD'S GREATEST MACHINE TOOL VALUE

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- Relieves miller, shaper and lathe of hundreds of over-load jobs.
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- ★ Avoids shut downs of important machines by actually making new replacement parts.
- ★ Makes special tools without dies or molds.
- ★ Saves hundreds of man hours — tons of metal.

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2. Under $2500
3. Under $2000
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All Models with Motor.

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Fig. 10—Section of keel of caisson in second group, shown as subassembled in the shop

when the dock closures were of rather small dimensions, caissons or gates were built exclusively of timber. Later, with the advent of the iron ship, this material was utilized to a great extent. In the present era of naval construction, caisson material consists mainly of steel.

Analysis of Caissons: In the earlier forms of framing arrangement, the design of the caisson involved no complex problems. The panels of timber were analyzed as simple beams spanning the two walls of the dry dock, each carrying the hydrostatic load within its

(*Please turn to Page* 123)

HEATING DATA

. . . . affords easy-to-use guide in many low-temperature heat treating operations such as preheating for welding

PREHEATING prior to welding is important on many types because it has the advantages of tending to eliminate the danger of formation of cracks and of reducing resulting hardness, distortion and shrinkage stresses, according to data recently released by Tempil Corp., 132 West Twenty-second street, New York.

Table I shows information reproduced from the "Tempil Heating Chart" copyrighted by this company. The purpose of this table is to indicate in the extreme righthand column the type of Tempil or Tempilstik to use to indicate the recommended preheat temperature. These are small pills or sticks which are placed on or rubbed against the metal to indicate when the particular temperature range for which they are designed has been reached. They constitute a simple yet fairly accurate temperature-measurement method.

The need for preheating increases as the following factors are changed:

—The larger the mass being welded.
—The lower the temperature of the pieces being welded.
—The lower the atmospheric temperature.
—The smaller the weld rod in diameter.
—The greater the speed of welding.
—The higher the carbon content of the steel.
—The higher the manganese content.
—The greater the alloy content in air-hardening steels.
—The more the air-hardening capacity of the steel.
—The greater the difference in mass between the two pieces being joined.
—The more complicated the shape or section of the parts.

In addition to indicating preheat temperatures for welding, the use of Tempils or Tempilstiks is also recommended for indicating temperatures in hard surfacing, torch or flame-cutting, heat treating, making shrink fits, brazing, soldering and similar work.

TABLE I—"Tempil" Heating Data

Metal Group	Metal Designation	Approximate Composition—Per Cent C.	Mn.	Si.	Cr.	Ni.	Mo.	Cu.	Recommended Preheat, Deg. Fahr.	Use These Tempils or Tempilstiks
Plain Carbon Steels	Plain Carbon Steel	Below .20	....	....	....	....	....	....	Up to 200	200
	Plain Carbon Steel	.20-.30	....	....	....	....	....	....	200-300	200-300-400
	Plain Carbon Steel	.30-.45	....	....	....	....	....	....	300-500	300-400-500
	Plain Carbon Steel	.45-.80	....	....	....	....	....	....	500-800	500-600-700-800
Carbon Moly Steels	Carbon Moly Steel	.10-.20	....	....	....	....	.50	....	300-500	300-400-500
	Carbon Moly Steel	.20-.30	....	....	....	....	.50	....	400-600	400-500-600
	Carbon Moly Steel	.30-.35	....	....	....	....	.50	....	500-800	500-600-700-800

Power Dives begin with POWER DRIVES

THE power dive that ends in vengeance for the treachery of Pearl Harbor, begins with power drives which convert horsepower into battle power.

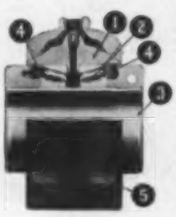
Power drive efficiency begins with bearings — guardians of vital horsepower on every power drive. Dodge Rolling Bearings insure factory-engineered efficiency for your drives. They are completely assembled, factory adjusted, prelubricated, shipped ready to install on the shaft and run at full load. There is no possibility of dirt entering Dodge Bearings as they are sealed both on and off the shaft. Ease of mounting saves precious time, and unit installation protects them from possible damage.

The right bearing for many of today's production jobs is the Dodge-Timken Clamp Sleeve Bearing. It is a general purpose bearing — rugged and dependable — designed for a life expectancy of 30,000 hours of service under conditions for which it is adapted. It is sealed against dust, dirt and lubrication leakage — 50,000,000 revolutions can be expected from one lubrication. Many types and sizes available immediately from local stocks.

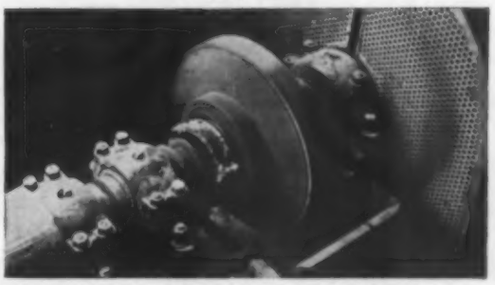
Dodge Distributors specializing in "The Right Drive for Every Job" provide industry with a source of supply from local stocks, including alternate selections. They offer their services in checking performance — assisting in modernization and extending equipment life. You can depend on them for valuable assistance in putting all your power in the job.

DODGE MANUFACTURING CORPORATION
Mishawaka, Indiana, U. S. A.

Features of Dodge-Timken Clamp Sleeve Bearings



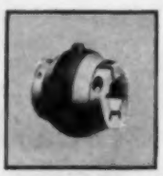
1. Full ball and socket self alignment guards against wear and power waste — simplifies installation.
2. Timken tapered roller bearings give full radial and thrust load capacity — vital to putting all power in production.
3. Full length sleeve gives larger distribution of load — reduces pressure — saves wear and power — lengthens drive life.
4. Indestructible steel seals guard against lubrication loss and admission of dirt — insure long hours of operation with little maintenance.
5. Rugged, well proportioned outer housing gives over-all protection to bearing.



Dodge-Timken Clamp Sleeve Pillow Blocks on Paper Machine Drive. Note also the Dodge Diamond "D" Clutch. This combination of Dodge-Timken bearings and Dodge clutches has been adopted in many mills because of dependable operation and low maintenance.

Dodge-Timken Clamp Sleeve Ball and Socket Pillow Block.

Dodge-Timken Clamp Sleeve "B1" Pillow Block.



Dodge-Timken Clamp Sleeve "D" Unit Mount.

Dodge-Timken Clamp Sleeve "B1" Unit Mount.

Dodge-Timken Clamp Sleeve "S1" Unit Mount.

Dodge-Timken Clamp Sleeve Bearings on Draw Rack Drive in Steel Mill. These bearings are designed for a life expectancy of 30,000 hours and normally require renewal of lubricant every 50,000,000 revolutions.

THROW YOUR SCRAP INTO THE SCRAP

BUY U. S. WAR BONDS FOR VICTORY!

DODGE
MISHAWAKA

THE RIGHT DRIVE FOR EVERY JOB

PUT *ALL* YOUR POWER IN THE JOB

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There's a crying need for more *and better* steel. It's your job to meet that demand . . . and Cities Service can help you do it.

Under the severest on-the-job tests, Cities Service Oils have proved *precision-perfect* for the exacting demands of wartime steel production. You'll welcome their help on such vital problems as quenching, heat-treating, machining, scale formation and rust.

You'll find it helpful, too, to confer with a Cities Service Lubrication Engineer, an experienced specialist who is right up-to-the-minute on lubrication developments in the steel industry. You'll value his suggestions on how to meet your quotas more efficiently, more economically.

Get in touch with your nearest Cities Service office and ask to have a Cities Service Lubrication Engineer call on you. No cost nor obligation, of course.

A NOVEL INSTRUMENT

The Cities Service Industrial Heat Prover is a special instrument developed by the Cities Service Research Laboratory. It enables those engaged in the oxygen control of furnace atmospheres to achieve certain physical results desired in the processing of metal, or in the control of the amount of combustibles present. Recordings are continuous and almost instantaneous. Full informationon request.

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ARKANSAS FUEL OIL COMPANY

SHREVEPORT . ATLANTA . BIRMINGHAM

Table—Cont. from Page 104.

Manganese Steels	Silicon Structural Steel	.35	.80	.25							300-500	300-400-500
	Medium Manganese Steel	.20-.25	1.0-1.75								300-500	300-400-500
	SAE T 1330 Steel	.30	1.75								400-600	400-500-600
	SAE T 1340 Steel	.40	1.75								500-800	500-600-700-800
	SAE T 1350 Steel	.50	1.75								600-900	600-700-800-900
	12% Manganese Steel	1.25	12.0								Usually Not Required	
High Tensile Steels (See Also Steels Below)	Manganese Moly Steel	.20	1.65	.20			.35				300-500	300-400-500
	Jalten Steel	.35 Max.	1.50	.30				.40			400-600	400-500-600
	Manten Steel	.30 Max.	1.35	.30				.20			400-600	400-500-600
	Armco High Tensile Steel	.12 Max.				.50 Min.	.05 Min.	.35 Min.			Up to 200	200
	Double Strength No. 1 Steel	.12 Max.	.75			.50-1.25	.10 Min.	.50-1.50			300-600	300-400-500-600
	Double Strength No. 1A Steel	.30 Max.	.75			.50-1.25	.10 Min.	.50-1.50			400-700	400-500-600-700
	Mayari R Steel	.12 Max.	.75	.35	.2-1.0	.25-.75		.60			Up to 300	200-300
	Otiscoloy Steel	.12 Max.	1.25	.10 Max.	.10 Max.			.50 Max.			200-400	200-300-400
	NAX High Tensile Steel	.15-.25		.75	.60	.17	.15 Max.	.25 Max.	Zr. .12		Up to 300	200-300
	Cromansil Steel	.14 Max.	1.25	.75	.50						300-400	300-400
	A.W. Dyn-El Steel	.11-.14						.40			Up to 300	200-300
	Corten Steel	.12 Max.		.25-1.0	.5-1.5	.55 Max.		.40			200-400	200-300-400
	Chrome Copper Nickel Steel	.12 Max.	.75		.75	.75		.55			200-400	200-300-400
	Chrome Manganese Steel	.40	.90		.40						400-600	400-500-600
	Yoloy Steel	.05-.35	.3-1.0			1.75		1.0			200-600	200-300-400-500-600
	Hi-Steel	.12 Max.	.6	.3 Max.		.55		.9-1.25			200-500	200-300-400-500
Nickel Steels	SAE 2015 Steel	.10-.20				.50					Up to 300	200-300
	SAE 2115 Steel	.10-.20				1.50					200-300	200-300
	2½% Nickel Steel	.10-.20				2.50					200-400	200-300-400
	SAE 2315 Steel	.15				3.50					200-500	200-300-400-500
	SAE 2320 Steel	.20				3.50					200-500	200-300-400-500
	SAE 2330 Steel	.30				3.50					300-600	300-400-500-600
	SAE 2340 Steel	.40				3.50					400-700	400-500-600-700
Medium Nickel Chromium Steels	SAE 3115 Steel	.15			.60	1.25					200-400	200-300-400
	SAE 3125 Steel	.25			.60	1.25					300-500	300-400-500
	SAE 3130 Steel	.30			.60	1.25					400-700	400-500-600-700
	SAE 3140 Steel	.40			.60	1.25					500-800	500-600-700-800
	SAE 3150 Steel	.50			.60	1.25					600-900	600-700-800-900
	SAE 3215 Steel	.15			1.00	1.75					300-500	300-400-500
	SAE 3230 Steel	.30			1.00	1.75					500-700	500-600-700
	SAE 3240 Steel	.40			1.00	1.75					700-1000	700-800-900-1000
	SAE 3250 Steel	.50			1.00	1.75					900-1100	900-1000-1100
	SAE 3315 Steel	.15			1.50	3.50					500-700	500-600-700
	SAE 3325 Steel	.25			1.50	3.50					900-1100	900-1000-1100
	SAE 3435 Steel	.35			.75	3.00					900-1100	900-1000-1100
	SAE 3450 Steel	.50			.75	3.00					900-1100	900-1000-1100
Moly Bearing Chromium and Chromium Nickel Steels	SAE 4140 Steel	.40			.95		.20				600-800	600-700-800
	SAE 4340 Steel	.40			.65	1.75	.35				700-900	700-800-900
	SAE 4615 Steel	.15				1.80	.25				400-600	400-500-600
	SAE 4630 Steel	.30				1.80	.25				500-700	500-600-700
	SAE 4640 Steel	.40				1.80	.25				600-800	600-700-800
	SAE 4820 Steel	.20				3.50	.25				600-800	600-700-800
Low Chrome Moly Steels	2% Cr.-⅛% Mo. Steel	Up to .15			2.0		0.5				400-600	400-500-600
	2% Cr.-⅛% Mo. Steel	.15-.25			2.0		0.5				500-800	500-600-700-800
	2% Cr.-1% Mo. Steel	Up to .15			2.0		1.0				500-700	500-600-700
	2% Cr.-1% Mo. Steel	.15-.25			2.0		1.0				600-800	600-700-800
Medium Chrome Moly Steels	5% Cr.-½% Mo. Steel	Up to .15			5.0		0.5				500-800	500-600-700-800
	5% Cr.-½% Mo. Steel	.15-.25			5.0		0.5				600-900	600-700-800-900
	8% Cr.-1% Mo. Steel	.15 Max.			8.0		1.0				600-900	600-700-800-900
Plain High Chromium Steels	12-14% Cr. Type 410	.10			13.0						300-500	300-400-500
	16-18% Cr. Type 430	.10			17.0						300-500	300-400-500
	23-30% Cr. Type 446	.10			26.0						300-500	300-400-500
High Chrome Nickel Stainless Steels	18% Cr. 8% Ni. Type 304	.07			18.0	8.0					Usually do not require preheat but it may be desirable to remove chill.	
	25-12 Type 309	.07			25.0	12.0						
	25-20 Type 310	.10			25.0	20.0						
	18-8 Cb. Type 347	.07			18.0	8.0			Cb. 10XC			200
	18-8 Mo. Type 316	.07			18.0	8.0	2.5					
	18-8 Mo. Type 317	.07			18.0	8.0	3.5					
Irons	Cast Iron										700-900	700-800-900
	Ni Resist										500-1000	500-700-900-1000
Nonferrous	Aluminum										500-700	500-600-700
	Monel										200-300	200-300
	Nickel										200-300	200-300
	Inconel										200-300	200-300
	Copper										500-800	500-600-700-800
	Zinc										200-300	200-300

Designs for Nonmetallic Reflectors Approved

Proposed simplified designs for nonmetallic reflectors for industrial fluorescent lighting fixtures recently were approved by the industry, and will be promulgated as a simplified practice emergency recommendation according to the Division of Simplified Practice, National Bureau of Standards, Washington.

The recommendation was developed at the request of the Building Materials Branch of the War Production Board to assist the industry to comply with the provisions of the amended Limitation Order L-73, "Fluorescent Fixtures", issued by WPB Oct. 19, this year. This order includes the requirement that nonmetallic materials be substituted in the manufacture of reflectors for fluorescent lights. The recommendation became effective Oct. 20 for new production, where the manufacturers would have to make any additions to existing dies or forming equipment, and will be designated as simplified practice emergency recommendations ER1-42.

This simplification of designs covers recommended dimensions, with tolerances, on standard R.L.M. reflectors, and will result in an estimated savings of steel of at least 50 tons a day it is reported.

INDUSTRIAL EQUIPMENT

Safety Hat

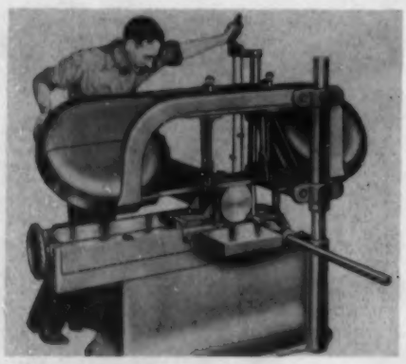
B. F. McDonald Co., 1248 South Hope street, Los Angeles, has introduced a new type P safety hat of laminated bakelite which features exceptional strength

and resistance to heavy blows. It provides the wearer with adequate ventilation in hot weather, and its light weight makes it comfortable to wear over day-long periods. Headband of the helmet is fully suspended to provide a cushioning hammock against the shock of heavy blows. In addition it is adjustable to all head sizes.

Cut-Off Saw

Wells Mfg. Co., Three Rivers, Mich., recently developed a V-12 metal cut-off saw for use in production cutting. It has a rectangular capacity of 16 x 12 inches and handles rounds up to 12 inches in diameter.

The machine features speeds of 53,



94 and 148 feet per minute. Its power is derived from a ¾-horsepower motor, by means of a V-belt. Bed of the machine measures 12 inches. Blade size used is 1 x 0.32 x 13 feet 9 inches.

Welding Machine

Wilson Welder & Metals Co. Inc., 60 East Forty-second street, New York, announces a new improved Bumble Bee alternating-current welder feature of which is its low open-circuit voltage of 42 volts, automatically and positively maintained by means of recent developments.

Two primary coils are used instead of the usual one, with a magnetic contactor in the circuit of one primary. Each primary contributes approximately 42 volts to the total open-circuit voltage, which is actually 84 to 85 volts. However, when the machine is idle one primary is automatically cut out, restricting the open circuit value to 42 volts. As soon as the electrode contacts the work, the second primary is thrown into the circuit, and if there were not a dead short, the voltage would be 84-85 volts.

When the operator draws an arc, this open-circuit potential of 84-85 volts enables him to establish his arc quickly and begin welding. When welding is completed and the operator pulls out or lengthens his arc, the arc voltage rises. The moment it reaches 45 volts, the con-

tactor opens and cuts out one primary, leaving only 42 volts in the open circuit.

Welder is portable and streamlined, and its 18-inch width permits easy passage through narrow doors. It has dual voltage connections for either 220 or 440 volts and thermal overload protection provided by a cutout coil buried in the winding. A single hand-wheel control gives an infinite number of current adjustments

Pocket Protractor

Industrial Engineering Co. Inc., Board of Trade Building, Chicago, announces a new pocket protractor for use by those engaged in the manufacturing-design or servicing of all classes of tools and machine work. It will measure directly any small or large surface angle such as are ground in tool bits without the aid of any attachments; measure the taper on shallow blind holes or tooth angles on broaches.

The adjustable sliding arm of the device can be swung 360 degrees. These degree graduations are arranged so the component angle can be read directly as well as the angle required. The sliding arm of the protractor also has been graduated so that the exact depth of holes can be measured.

Pneumatic Drill

Ingersoll-Rand Co., 11 Broadway, New York, announces a new lightweight size OCA pneumatic drill which weighs less

than two pounds, and powered by a Multi-Vane air motor constructed to stand three-shift operations. It features a built-in speed regulator that can be set for desired performance. A split-second throttle action permits quick, accurate hole-starting. Lubrication is provided by a built-in automatic oiler.

Because of its light weight and pistol grip, the drill can be used hour after hour without fatigue making it an ideal tool for women operators. A chuck protective shield also enables the operator to guide the drill more effectively by grasping the shield with fingers of his free hand.

Operation Counter

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new operation counter for protector tubes used on 13.8 to 138 kilovolt transmission lines. It is designed to be mounted

on the vent pipe from the protector tube.

When the protector tube operates, part of the gas blast leaves through the small horizontal tube on which the counter is mounted, blows off on the copper blades in the counter box causing the box to fall into another angular posi-

With Their Help We'll Win

These women, machining precision parts on South Bend Lathes in a vital war plant, are typical of thousands of women who are doing their part to win the battle of production.

With eager hearts and nimble fingers, thousands of American women are working shoulder to shoulder with men in vital war industries — replacing those who have left their machines to defend their country. And they are doing a fine job of filling men's shoes, for they know that the battle of production must be won to keep their men at the front supplied with the guns, planes, tanks, bullets, and thousands of other things an army must have to be victorious.

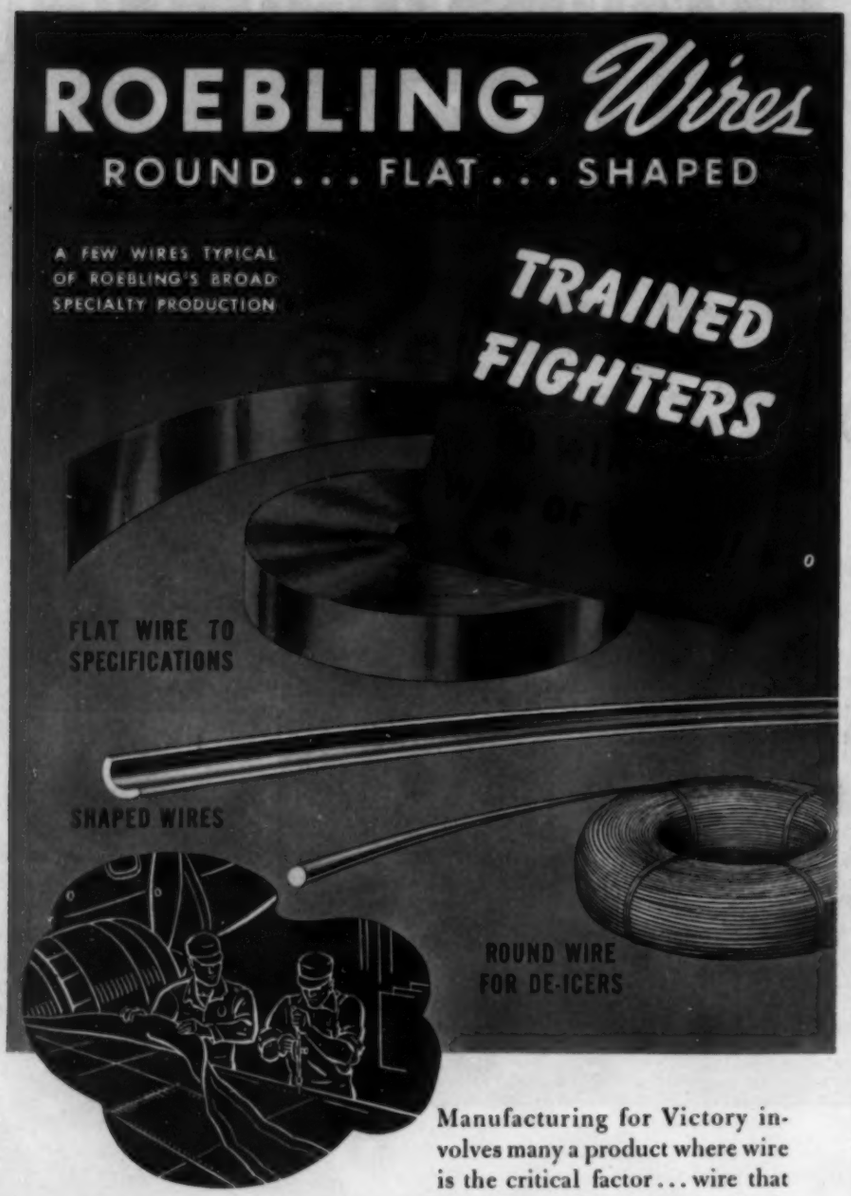
Women learn to operate South Bend Lathes in a surprisingly short time. Not that just any girl can become an expert machinist or toolmaker over night. But on certain classes of work—the kind of work you would expect a beginner to do—women are highly successful.

Quick to appreciate quality, women like South Bend Lathes. They like the fully enclosed design with no exposed pulleys, belts, or gears—the smooth operation of conveniently placed controls—the absence of rough edges and sharp corners that might catch their clothing—the dependable precision that enables them to turn out maximum production, even when extremely close tolerances are specified. And, most of all, they appreciate the ease of operation which reduces fatigue to a minimum and seemingly shortens the work-day by hours.

South Bend Engine Lathes and Toolroom Lathes are made in four sizes, 9″ to 16″ swings. South Bend Turret Lathes are available in three sizes. Write for information, specifying size and type of lathe in which you are interested.

"HOW TO RUN A LATHE"
A valuable handbook for apprentice training. Explains the operation and care of engine lathes. 128 pages—365 illustrations. Sent postpaid for a 25c War Stamp.

SOUTH BEND LATHE WORKS
SOUTH BEND, INDIANA — LATHE BUILDERS FOR 36 YEARS


ROEBLING Wires
ROUND . . . FLAT . . . SHAPED
A FEW WIRES TYPICAL OF ROEBLING'S BROAD SPECIALTY PRODUCTION
TRAINED FIGHTERS
FLAT WIRE TO SPECIFICATIONS
SHAPED WIRES
ROUND WIRE FOR DE-ICERS

Manufacturing for Victory involves many a product where wire is the critical factor . . . wire that must be made to new standards of toughness, accuracy and finish. Gain time and get more out of your equipment by letting Roebling solve these problems for you . . . delivering wire that is ready and willing to go to work without further processing.

Steel backbone for the pulsating rubber strip that cracks ice off leading edges of airplane wings is typical of many special round, flat and shaped wires that are rolling from the Roebling mills today. We know the importance of steel analysis and grain structure in these war-bound wires . . . of rolling and toughening and finishing them to avoid delays on both the production and fighting fronts. And we have the experience and facilities to deliver . . . on schedule.

You, too, can get one jump ahead on production quotas when you start with Roebling wire . . . made to specifications demanding closest adherence to physical and chemical requirements. Prompt action on war orders.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY · Branches and Warehouses in Principal Cities

tion. Each time a blade is blown out the new position of the counter indicates the number of times the protector tube has operated.

Instructions for the device give methods of mounting it on practically all types of protector tubes. Blades are available for reloading, and the counter is provided with a loop-shaped strap which makes it possible to install and remove it by means of a hook stick.

Skid Platform

Union Metal Mfg. Co., Canton, O., announces a new type materials handling unit, an open-end inverted skid for moving and storing long bars or odd-shaped parts. Units actually are standard skid

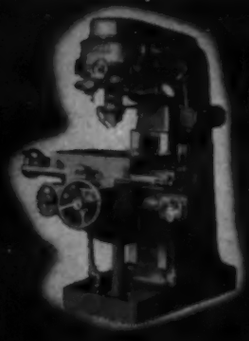
platforms, turned upside down and equipped with eyed brackets for insertion of crane hooks. Their corrugated design provides added strength and durability, and they can be handled well with crane, hand pallet or power fork trucks.

Turret Lathe

International Machine Tool Corp., Foster Division, Elkhart, Ind., announces a new No. 5 ram type turret lathe featuring a collet chuck capacity of 2 inches in diameter, and having a 17½ inch swing over the ways. Supplied complete with tools for both bar and chucking work, it will accommodate 8, 10 and 12-inch diameter chucks, in addition to special attachments which conform to specific types of turret lathe work.

Attachments include bar feed and collet chuck, taper attachment and threading attachment. The heavy machine bed of the lathe features cross ribs that provide reinforcement for supporting the carriages. The headstock top supports the transmission shafts. The double bed ways are of semi-steel, tongued and grooved. Spindle control is provided by a lever mounted on top of the headstock, which controls the double multiple disk clutch on the main drive

Machines, Accessories and Attachments for a Wide Variety of Needs:



Rotary Head Milling Machine

Autometric Jig Boring Machine

Milwaukee Midgetmill

Milwaukee Speedmill

Milwaukee Face Mill Grinder

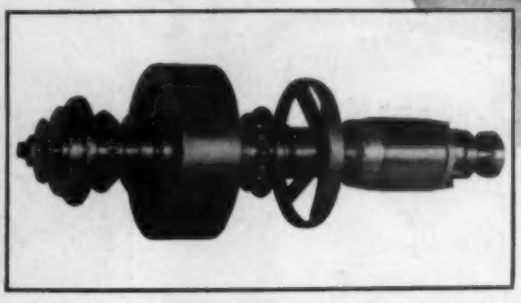
Center Scope

THE MILWAUKEE FACE MILL GRINDER GIVES YOU *ALL* THREE!

1 UNUSUAL RIGIDITY

2 REDUCED SHARPENING TIME

3 ACCURACY TO WITHIN .0002 PER INCH



The three-bearing spindle rotates at 3,400 R.P.M. and carries a heavy flywheel, the inertia of which when in motion successfully keeps the abrasive wheel up to grinding speed. Sharpening time has been considerably reduced as a result.

THE basic design of the Milwaukee Face Mill Grinder embodies strength, precision, and capacity. It is capable of sharpening Tungsten Carbide Cutters ranging from 3" to 16" in diameter — grinds the blades to within .0002 per inch.

Set-ups are quickly made with graduated dials, facilitating adjustments. Other controls are handily located for simplified operation.

OTHER IMPORTANT FEATURES:

1. Jeweled bearing dial indicator for accurate checking.
2. Finger tip control.
3. Fine thread precision saddle screw.
4. Hand screw permits angular setting of 15° on either side.
5. No adapters necessary.
6. Spindle has No. 50 National Standard Taper.
7. Blower system at slight extra cost.

Reject the Source of the Error . . . not the Finished Product . . . Use CENTER SCOPE!

The Center Scope is an optical locating machine shop tool, constructed for use on any machine from jig borers to bench drills. No technical knowledge or training is needed to use it. It is a necessary production tool — necessary today because you are interested in saving time — tomorrow, because you will be interested in saving cost.

Built in various models; variable and rotating Center Scope priced at $97.00, with taper shank, $125.00; Special Center Scope, $125.00 — Edge Block, $23.00 additional.

Write Department CS, for complete information.

KEARNEY & TRECKER PRODUCTS CORPORATION • *Milwaukee, Wisconsin*

Kearney & Trecker *Products* CORPORATION

Subsidiary of Kearney & Trecker Corporation

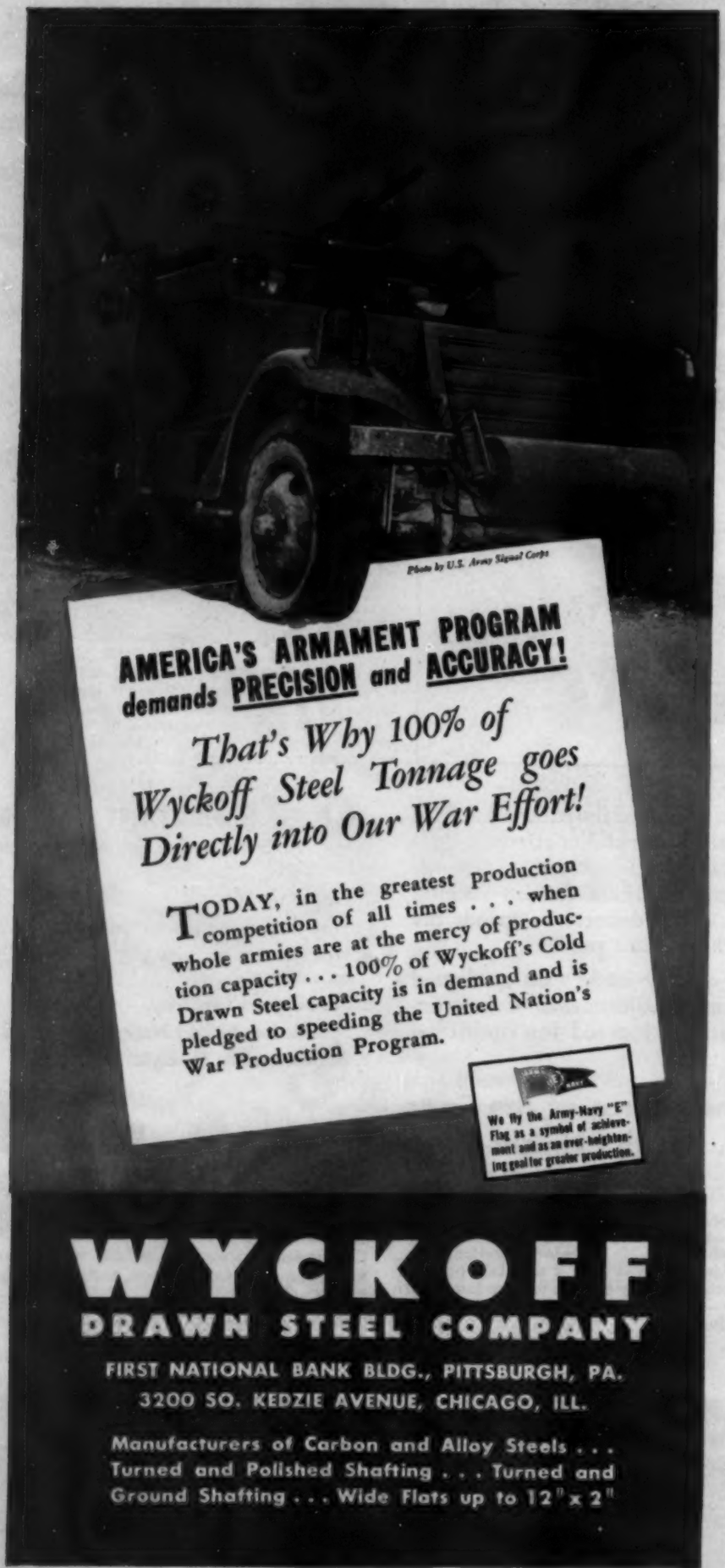
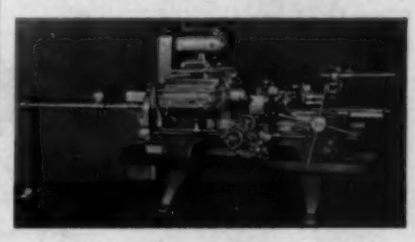


Photo by U.S. Army Signal Corps
AMERICA'S ARMAMENT PROGRAM
demands PRECISION and ACCURACY!
That's Why 100% of
Wyckoff Steel Tonnage goes
Directly into Our War Effort!
TODAY, in the greatest production competition of all times . . . when whole armies are at the mercy of production capacity . . . 100% of Wyckoff's Cold Drawn Steel capacity is in demand and is pledged to speeding the United Nation's War Production Program.
We fly the Army-Navy "E" Flag as a symbol of achievement and as an ever-heightening goal for greater production.
WYCKOFF
DRAWN STEEL COMPANY
FIRST NATIONAL BANK BLDG., PITTSBURGH, PA.
3200 SO. KEDZIE AVENUE, CHICAGO, ILL.
Manufacturers of Carbon and Alloy Steels . . .
Turned and Polished Shafting . . . Turned and
Ground Shafting . . . Wide Flats up to 12" x 2"

shafts. It is used to shift the machine into neutral. Lever marked R controls forward and reverse spindle rotation.

The all-geared headstock provides 8 spindle speeds which are controlled by 3 levers mounted on top of the headstock convenient to the operator. Individual motor drive is provided for the machine, and power is transmitted by silent-operating multiple V belts. The carriage is provided with 6 reversible cross and longitudinal feeds which operate independent of the hexagon turret carriage. Feeds are engaged by individual levers which operate large diameter friction clutches. Machine's cross slide holds the quick indexing square turret at the front. Rear of the slide is drilled and tapped for holding rear tool holders and forming tool holders.

Six power feeds are available with the hexagon turret ram slide carriage. These are engaged by a quick-acting lever on the turret apron. Automatic feed trip



and dead stop is provided for each face of the hexagon turret by means of a 6-screw stop roll. The hexagon turret is automatically unclamped, indexed and reclamped by means of a 4-spoke pilot wheel which controls the forward and reverse movement of the ram slide. Lubrication is applied automatically to the machine, the headstock serving as a reservoir.

Bonding Ring

Cannon Electric Development Co., Los Angeles, announces a new bonding ring which may be used wherever there is a need for bonding between an electrical plug shell and wire shielding, and may be used with either flexible conduit coupling nut or cable clamp. It is used almost exclusively at present in bonding shielded radio and instrument circuits but is adaptable to many other applications where a tight bond is required. The unit is said to fit a variety of conduit nuts.

Motor Relay

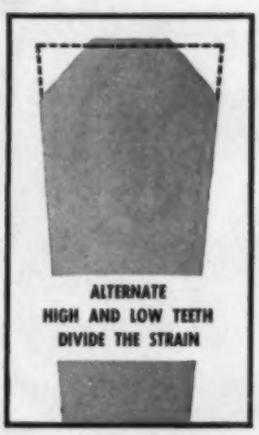
Barber-Colman Co., Rockford, Ill., announces a new Motorelay for use with any floating contact device in applications where the control current exceeds the contact rating of the control instrument. Construction of the unit includes

THE MOTCH AND MERRYWEATHER

Triple-Chip

METHOD OF SAWING METAL

Increases SPEED AND *Lengthens* BLADE LIFE



Those three curling chips mean much to cutting efficiency and length of service. They speed up production and make the blade last longer.

The segments of the M. & M. saw blade form a closed ring which adds strength and rigidity. Each two teeth, ground alternately high and low, make a cycle. The first, or higher, tooth has the corners bevelled off at a 45-degree angle. The middle third of the cutting edge meets the work, *taking out the center of the cut.* The second or finishing tooth, slightly lower but full width, *removes the two remaining corners.*

This distributes the shock. One wide and two narrow chips are formed. The bevelled blade does not have to "get under" the full load. The strain on the finishing tooth is likewise divided.

Strain and frictional heat per tooth are reduced. Heavier feeds lower cutting time. Squarer cutting results. The blade "lives longer."

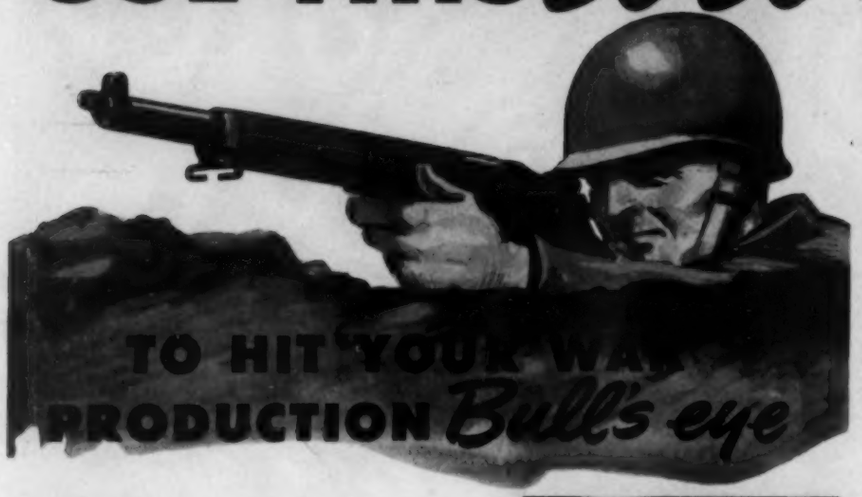
Many other practical advantages, too. Get the full story in our new "Flyer."

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
Penton Building **Cleveland, Ohio**

Built by **MOTCH & MERRYWEATHER**

THE MOTCH AND MERRYWEATHER MACHINERY CO
CLEVELAND DETROIT
CINCINNATI PITTSBURGH

USE THIS 30-30



30 Years experience in manufacturing sheet-metal special products.

30 Months experience in making war products.

Sub-contracting experience in fabricating sheet aluminum, brass, copper and steel for munitions, planes, ships, guns and mounts.

3 Plants with modern facilities are available for sub-contract jobs that require shearing, forming, stamping, drawing, welding, brazing, finishing and assembling.

One plant is organized for high-speed fabrication, electro-galvanizing, enameling and assembly of small parts.

Send your blueprints with delivery requirements for any kind of sheet-metal work from 7 to 30 gauges to an experienced organization that knows how. No obligation.

ALUMINUM WELDING—New "stored energy" type of welding equipment is now available for sub-contract jobs.

HIGH-SPEED ASSEMBLY—Tapping, riveting and assembling of metal parts up to 14 gauge.

ALL-STEEL-EQUIP COMPANY, INC.

612 Archer Avenue • Aurora, Illinois

☐ Send me the new booklet showing the facilities, capacity and experience of the three All-Steel-Equip Company plants.

☐ Have an A-S-E representative call.

Name.....

Address.....

City.....State.....

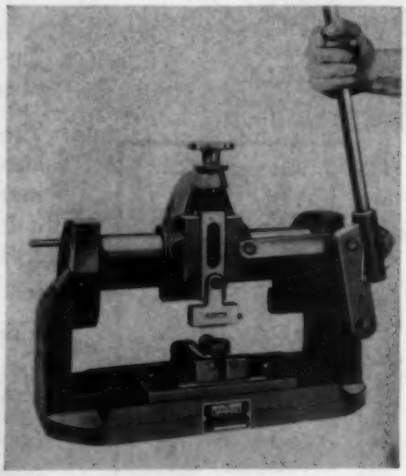
a shaded pole, reversible geared-head motor, totally enclosed switches and switching mechanism. An enclosed type

drawn steel cover also is available.

Units' switch contacts have a non-inductive load capacity of 10 amperes at 110 or 230 volts alternating current. The control circuit current is 0.35 amperes at 25 volts.

Marking Machine

Acromark Corp., 398 Morrell street, Elizabeth, N. J., announces a new No. 9A marking machine designed to permit untrained personnel to make perfect markings at all times on shell, shot, tubular and cylindrical parts and pieces. It is offered with a diversity of accessories for precision markings



with either the hand operated or motor-driven marking machine.

Operation is claimed to be extremely simple. At the pull of the lever, a uniform mark of any desired depth is made; another part is marked on the return stroke. The motorized unit can be operated at a set speed to suit the feeding speed of the operator.

Construction consists of gray iron castings for base and head, shaft and bearing bar of cold drawn steel, head

gibs and slide of tool steel, and all bearing surfaces are cast iron against steel. Unit measures 14⅜ inches in height, 17¼ inches in length and 7¾ inches in depth.

Safety Clothing

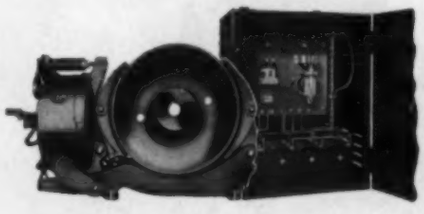
General Electric Co., Schenectady, N. Y., announces a complete line of safety clothing designed especially for women welding operators. Safety, durability, and smart styling are combined in the new line which is based on the results of an extensive industrial survey of safety requirements for women welders, according to the company.

Featured in the line are leather

sleeves, aprons, jackets, leather gloves, and a special women's head and hair covering. The head covering protects the hair from sparks and slag, and can be used with any of the modern welding helmets. All items in the line are comfortable, and light in weight—yet they provide full protection.

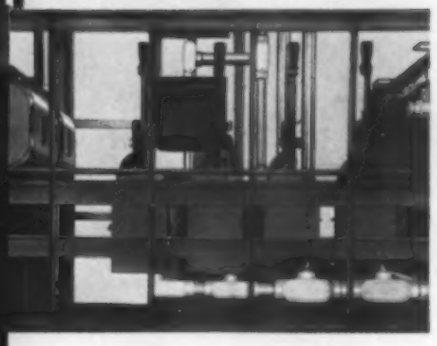
Crane Brake

Electric Controller & Mfg. Co., Cleveland, announces a WPB crane or hoist brake for service on alternating-current circuits. Its main feature is its speed of operation in setting and releasing to



make possible accurate inching of hoists, cranes etc. The brake is spring-set and magnetically released. It and its rectifier-unit are available for use with any

WITH uncommonly strong ELECTRICAL CONSTITUTIONS TOO!



Euclid CRANES and HOISTS

Similar to the blood stream and vital organs of the human body are the electric circuits, motors, controllers, etc. of electric cranes and hoists.

In recognition of their importance Euclid has adhered consistently to a policy of installing "better than necessary" electrical equipment.

The *wiring* of Euclid Cranes and Hoists is heavier, more carefully applied and more thoroughly guarded than that of other equipment. Specially built *controllers* are used. Only first quality *crane type motors* are installed. *Protective devices* for all motors are installed and *every safety factor* for the protection of operators is installed.

To all who may be interested we will gladly explain in detail the various exceptional electrical features of Euclid Cranes and Hoists that provide "*uncommonly strong electrical constitutions*" and are largely responsible for their long life and unexcelled performance.

Write for crane and hoist catalogs and investigate Euclid equipment before placing your next order.

The EUCLID CRANE & HOIST COMPANY

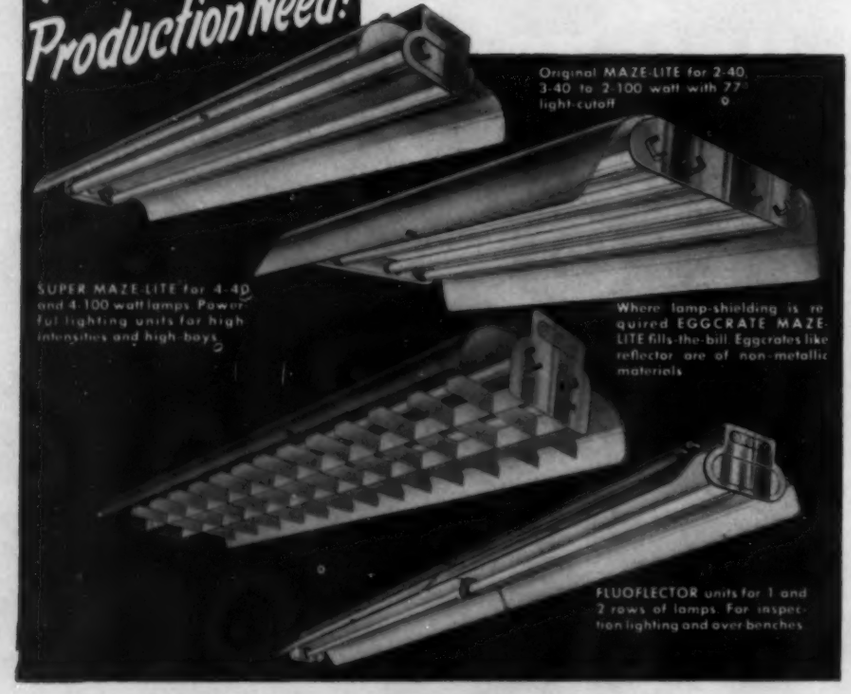
EUCLID, OHIO *Suburb of Cleveland*

HERE'S REAL NEWS!

New Guth Non-Metallic Reflectors Deliver More Light Than Porcelain Enamel!

4 Efficient Designs, for Every War Production Need!

GUTH Fluorescent is now made with Non-Metallic Reflectors to conserve vital materials for war industries. Yet this conversion has in no way necessitated any sacrifice in lighting efficiency! In fact the durable "300° White" synthetic Baked-Enamel, plus the engineered design, actually produces greater light output than do Porcelain Enameled Steel Reflectors! Get this quality lighting—now available in non-metallic units!


Original MAZE-LITE for 2-40, 3-40 to 2-100 watt with 77° light-cutoff
SUPER MAZE-LITE for 4-40 and 4-100 watt lamps. Powerful lighting units for high intensities and high bays
Where lamp-shielding is required EGGCRATE MAZE-LITE fills-the-bill. Eggcrates like reflector are of non-metallic materials
FLUOFLECTOR units for 1 and 2 rows of lamps. For inspection lighting and over benches

Write today for Newest Literature

FORTIETH YEAR OF Guth LIGHTING LEADERSHIP

THE EDWIN F. GUTH CO. • 2615 Washington Ave. • St. Louis, Mo.

magnetic or manual control.

A standard brake includes the following apparatus: Proper size brake with Ecamite wheel for floor mounting; copper-oxide rectifier; double-break contactor between rectifier and brake; current-reducing, adjustable resistor and relay.

Welding Transformer

Acme Electric & Mfg. Co., Cuba, N. Y., announces development of special welding transformers for operation on primary circuits of 115 volts, single

phase, 60 cycle and having secondary characteristics of 0.75 volt, 1600 amperes. The development already is said to be playing a vital part in the country's war effort.

Precision Miller

Lincoln Machine Specialties Co., 549 West Washington street, Chicago, has introduced a new heavy duty Uni-Mill machine which accommodates any high speed milling head. It is designed to

handle heavy duty high precision jobs thereby releasing power driven milling equipment for other essential work. The unit with its unusually large table—10 x 42 inches—handles up to a 30-inch cut. Ample stability for heavy pre-

cision work is assured by its 2300 pound weight. The machine is supplied either with or without detachable head.

Floodlight

Commercial Metal Products Co., 2255 West St. Paul avenue, Chicago, has introduced a one-piece formed steel Comp-

co floodlight which can be installed and adjusted to almost any position because of its 3-way mounting. It is offered in all sizes from 200W to 1500W units.

Slide Rule Helps User To "Find" Right Motor

To help motor users fill wartime motor needs with least possible delay, and conform to recent WPB recommendations, Allis-Chalmers Mfg. Co., Milwaukee, is offering a new "motor finder" which shows quickly how to select various types of squirrel-cage motors.

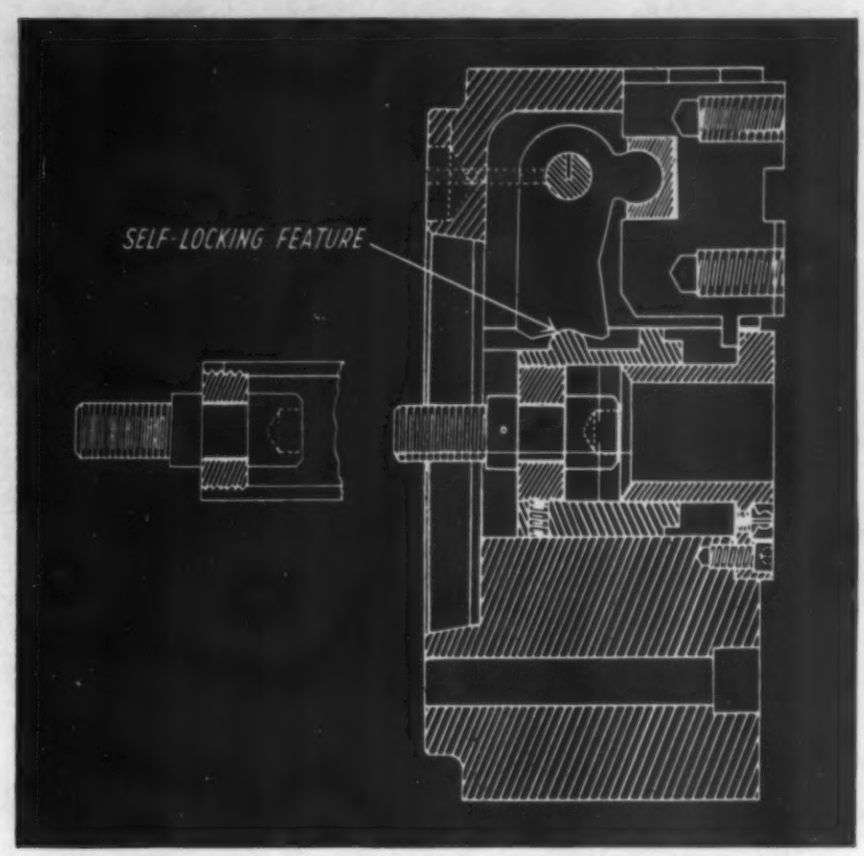
Standard types of the squirrel-cage—the most readily obtainable motor—are actually even more versatile than is commonly realized, the motor manufacturer points out.

With the "motor finder" slide-rule, the motor user is able to match the conditions under which the motor must operate at the proposed installation with the required motor characteristics and instantly learn the right motor type and its features. The slide-rule is offered free on request.

Substitute Lighting Unit Saves 27 Pounds of Steel

Substitution of a new wooden fluorescent lighting unit for its metal products is announced by Wakefield Brass Co., Vermilion, O. This substitution is reported to effect a saving of 27 pounds of steel per 4-lamp unit.

Lighting characteristics of the metal unit are retained in the newer product. Its bass-wood louvers provide adequate shielding and are hinged for easy cleaning and relamping.



A Different Air Chuck

Self-locking both ways—double-gripping power—lower air consumption! These are among the features of Anker-Holth Air Operated Universal Three Jaw Chucks—*the air chucks that are different.*

The exclusive design of Anker-Holth chucks permits heavier cuts and coarser feeds. The wedge action of the cam on the bottom of the levers—operating in both directions—more than doubles the gripping power obtained through leverage alone. The jaws lock securely, whether gripping externally or internally. Work is held tightly, should the air pressure drop or be cut off entirely.

Self-locking, double-power, three jaw "Airgrip" chuck—by Anker-Holth Mfg. Co.

Anker-Holth Air Chucks give you more power when you need it. And, that extra power means you can reduce air consumption by using smaller cylinders.

It will be worth your while to know more about the Anker-Holth line of high speed rotating air cylinders that permit high spindle speeds; air operated collets and expanding arbors; and, air filter, automatic lubricator, and regulating valve units.

IMMEDIATE DELIVERY—3" TO 14" AIR CYLINDERS!

Anker-Holth Mfg. Co.

"AIRGRIP" CHUCK DIVISION

332 So. MICHIGAN AVE. • CHICAGO, ILL.

LIKE Axis submarines lurking in our convoy lanes to strike at the life lines of supply, DUST can slow down, even stop the production lines of Industry. But—just as the hazards of raiding U-boats can be effectively checked by our fighting ships, so can the danger of dust be controlled in war production plants. Spoilage, rejects, do-overs, caused by atmospheric and process dusts can be largely eliminated with AAF dust control.

The American Air Filter Company has developed through 22 years of research and experience, dust control equipment to meet every industrial need, and each AAF unit, like each type of fighting ship, is especially designed to do a specific job effectively. If you have a troublesome dust problem, our engineers are available without obligation to help you. Write for new bulletin, "AAF In Industry", which describes the complete line of AAF equipment.

AMERICAN AAF AIR FILTERS

AMERICAN AIR FILTER CO., INC.
INCORPORATED
443 CENTRAL AVENUE LOUISVILLE, KENTUCKY
In Canada: Darling Bros., Ltd., Montreal, P. Q.

Propane Cutting

(Continued from Page 82)

the metal. This makes for low machining costs.

It was once believed that oxypropane cutting time was slower, but this is quite decidedly disproved by the Dodge Steel Co.'s experience. The thought was that the lower flame temperature of propane was the cause of this presumed slowness. However, flame temperatures affect only the preheat time, and then only in a small degree. Once the action is started, it is the oxygen that burns up the metal in the cut. The function of the flame is mainly to maintain, control and direct the course of the oxidation. The lower flame temperature and flame speed appear to result in a more perfect oxidation and a more rapid cutting speed, according to this company.

The average torch operator required five days, sometimes less, to become familiar with using the oxypropane torch. Some patience is required to attain proper "feel" and manipulation. Cutters find that the quickest technique is to cut parallel to the greatest thickness wherever possible. To reduce preheat time, cuts should be started at some point which presents a rough edge rather than a smoothly rounded surface.

The oxypropane flame does not require a clean surface for the cutting operation. This reduces the amount of the cleaning and chipping required to prepare castings for cutting. The slightly lower flame temperature of the oxypropane torch melts a minimum amount of metal on each side of the cut. As a result, less molten metal flows down into the cut.

Aside from riser cutting, other industrial propane uses are being extended. Propane has replaced oil for annealing castings, in many instances permitting closer control over scaling conditions and operating temperatures. And when drying cores, the use of automatic temperature control with industrial propane lessens the hazard of burned cores. In fact, a better quality of core results. Too, smoke and fumes are eliminated.

Propane is also advantageous for the skin drying of molds. Having a specific gravity of 1.5, a fairly rich setting of the mold-drying torch produces a heavy air-gas mixture with high penetration through every portion of intricate molds and particularly those points below floor levels that are difficult to reach by other methods. A drying depth of better than 6 inches is easily obtained.

All this indicates there is sufficient evidence to warrant a restudy of propane as an industrial fuel by those technicians who may previously have ruled it out of consideration. Much progress has been made in equipment and technique.

NE Alloy Steels

(*Continued from Page* 99)

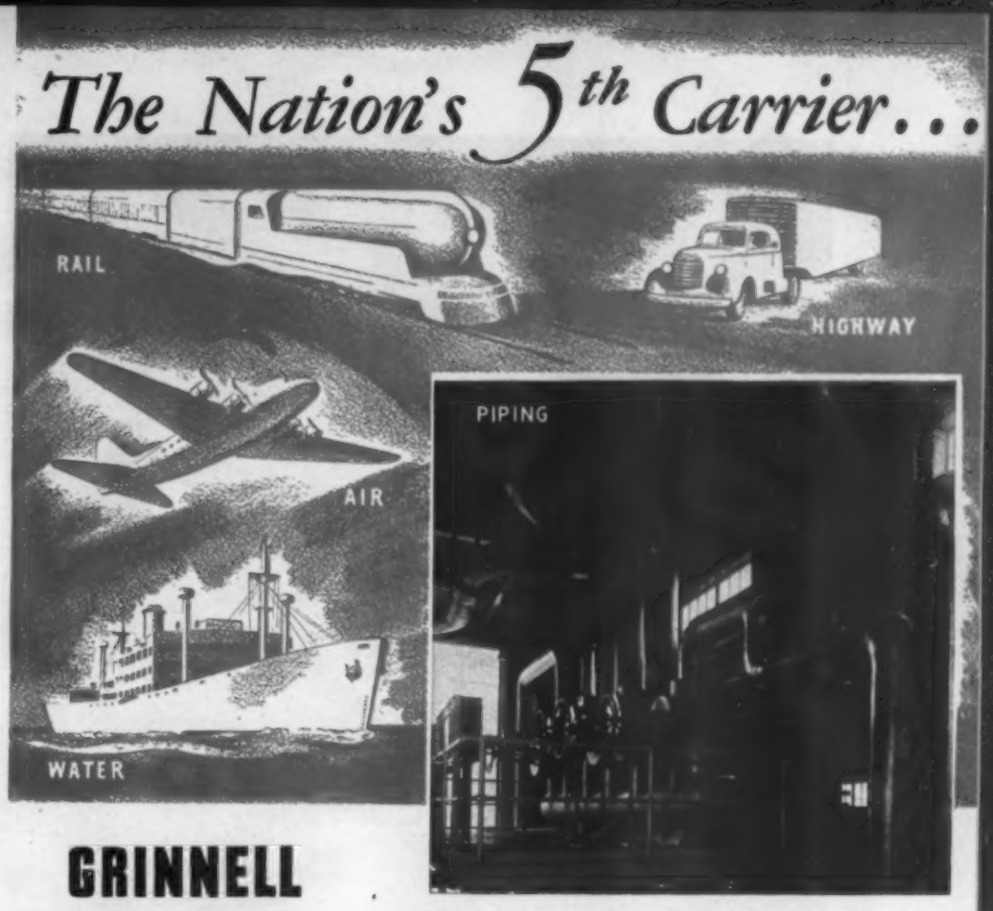
rials he is using and the use to which his product is being put.

We all know that in previous days the development of a new steel coursed along a thorny path and had to overcome many obstacles as well as prejudices. Not so with the NE steels; their introduction was rapidly made and their subsequent use even more rapidly accomplished. The chemical compositions were arrived at by conferences rather than by a series of experimental researches. Questions arose in the minds of the users and will continue to do so until the new steels "become of age". Some of these questions were: How will the new steels react to normalizing heat treatments for optimum machinability? How will they carburize and what type of case will be obtained? What hardness can be expected on direct quenching or reheating? What about fatigue life? Or chipping in clash gears?

All of these questions could arise with only one steel in earlier days, and here are two whole series in our midst. The task of learning all these things at first looked formidable, but in a remarkably short time considerable information from many laboratories was accumulated and made available to all publications—particularly the *Manufacturer's Standard Practice Supplementary Information Sheets* published by the American Iron and Steel Institute, all of which have appeared in STEEL. See list of articles p.99. Such data as resistance to fatigue and wear, torsional properties and carburizing characteristics as have been accumulated over a period of years on our prewar steels must yet be accumulated on the new steels. On the basis of the data made available so far, the NE 8000 series steels conform within certain limits to our former steels and appear to be measuring up to the predictions voiced for them by their originators.

Conditioning for Machining: The series of new steels running from NE 8615 up through the NE 8749 respond to normalizing heat treatments for machinability somewhat as do the regular SAE steels except that in general somewhat faster cycles can be used for equivalent carbon contents. This evidently is associated with the reduction in nickel content. The carburizing grades, especially, can be annealed faster with less tendency to form martensite as a result of withdrawal too early from the furnace at temperatures below 1000 degrees Fahr.

According to dilatometer tests the Ar_1 point of NE 8620 is 1270 degrees Fahr., whereas it is 1175 degrees Fahr. for SAE 4620. For a somewhat accelerated cool from the austenitizing tempera-



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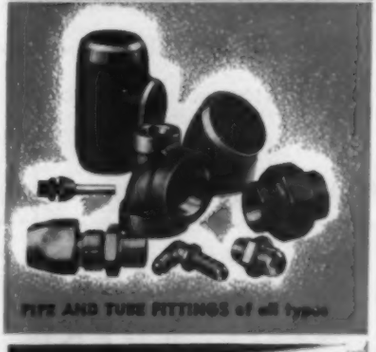

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ture, an even greater divergence is possible. For the same cooling cycle from 1700 degrees Fahr., some idea of the decreased hardness obtainable with NE 8620 and NE 8720 in comparison with SAE 4600 and SAE 2515 is shown below:

Average Brinell Hardness After Retarded Cool from 1700 Degrees Fahr.

NE 8620	137
NE 8720	156
SAE 4620	170
SAE 2515	187

The above hardness values suggest that machine operations such as drilling, shaping and broaching might best be accomplished with a straight air cool from the normalizing temperature when employing the NE 8620 steel if the smoothest finish is required. Reports so far indicate that there has been no sacrifice in finish where the NE 8600 and 8700 carburizing grades have been used as alternates for prewar steels. Some reports are even optimistic enough to claim decided improvements. There has also been favorable comment on the machinability of the medium and higher carbon NE steels of the 8600 and 8700 series used in the automotive field.

Carburized Case Characteristics: The NE 8620, NE 8720 and NE 8817 steels carburize very similarly as shown in Table I, which gives the carbon concentration by depth of these steels carburized simultaneously at 1680 degrees Fahr. in a high percentage coke-charcoal compound. For comparison, SAE 2315 and SAE 6120 steels are inserted in the same table. Though they were not carburized simultaneously, they do represent typical values obtained from periodic tests through the same furnace and cycle. One test on NE 4027 is also included.

In Table II is shown a more direct comparison between the carburizing characteristics of NE 8720 steel and SAE 4620 steel carburized adjacent to each other in coke-charcoal type compound at 1700 degrees Fahr. and also in a pit-type gas carburizer at 1650 degrees Fahr., using a liquid-type carburizing fluid. The NE 8720 appears to be more reactive to gaseous carburizing media. This phenomenon was rechecked at a later date, and the same results were found. At a carburizing temperature of 1700 degrees Fahr. this reactivity in gaseous carburizing media would be even greater; otherwise, below the surface the NE 8720 and SAE 4620 are strikingly similar in their rates of carbon absorption under identical carburizing conditions.

Test pieces in the form of 1.1-inch diameter by ⅜-inch thick disks from NE 8620, NE 8720 and NE 8817 steel were carburized simultaneously with regular production parts to two case depth ranges—0.035 to 0.050-inch and 0.050

to 0.065-inch respectively. One-half the test pieces were quenched direct into oil from the pot, and the other half were allowed to cool in the pot for a reheat later to 1525 degrees Fahr. followed by an oil quench. All samples were then drawn at 300 degrees Fahr. for 1 hour. Another set was carburized in a continuous gas carburizer at 1700 degrees Fahr. on a cycle to produce 0.050 to 0.065-inch case depth and then was quenched direct into oil followed by a 300-degree Fahr. draw.

Microstructures of case and core resembled those obtained from the familiar SAE 4620 steels except the case depth range of 0.050 to 0.065-inch caused the formation of disconnected globular-type carbides at the corners of the samples. No accumulation of these carbides was visible on the samples carburized 0.035 to 0.050-inch case depth. This observation might become useful in combatting chipping of teeth in clash gears. After hardening and drawing, the disks were tested for case and core hardness, the values being shown in Table III and the chemical analysis in Table IV.

The somewhat lower case hardness value of around 56 to 58 rockwell C shown for the direct-quenched samples in Table III, either pot or gas carburized to 0.068-inch case depth, is comparable to that of the more familiar SAE 4620 steel. As is to be expected, the lesser amount of retained austenite in the more shallow case depth of 0.040-inch permits a case hardness of 60 rockwell C or more even though direct quenched. The reheated samples, regardless of whether carburized to 0.040 or 0.068-inch case depth, develop case hardness above 62 to 65 rockwell C.

The corners of the cases produced with the NE 8620, NE 8720 and NE 8817 steels in actual gears can be peened with hammer blows without chipping similar to the popular prewar steels such as SAE 4620, SAE 3115, SAE 2315 steels. In other words, the carburized cases have some degree of malleability. Fracture tests of case and core made of both direct-quenched and also pot-cooled and reheated parts so far appear to be somewhat coarser than the former steels alloyed higher with nickel, chromium and molybdenum. There is more of a tendency to form crystalline breaks, especially in the core, as compared with fibrous breaks such as are common to SAE 4620 steel.

Response to Jominy End-Quench Test: As a matter of additional interest, the Jominy or end-quench test results for the three steels shown under Table IV are included. These show how some of the original commercially made heats conform to the early data published by the American Iron and Steel Institute

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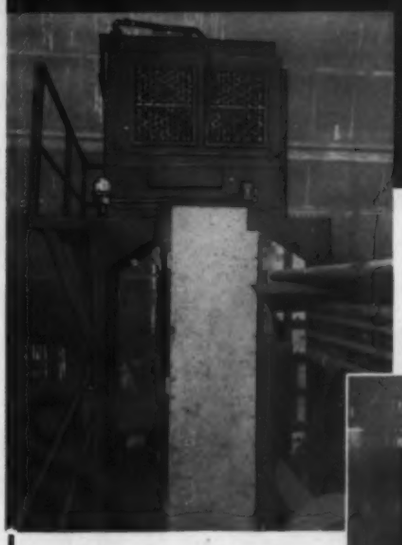

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and which, because of the urgency, were obtained from small experimental furnace heats. The curves for the end-quench tests are shown in Fig. 1. The tests were performed according to recommended procedure—that is, quenching from approximately 50 degrees Fahr. above the AC_3 point of the steel. The quenching temperature used therefore was 1575 degrees Fahr.

Incidentally, during the past few years we have used the end-quench test interchangeably with our standard 1-inch round by 3-inch long hardenability test piece. The hardness produced at the center of our 1-inch round test bar has been proved after many tests to be approximately close the hardness at 3/8-inch from the end of the regular Jominy test piece, each having been cut adjacent to each other from the same bar sample. Table III shows how close is this relationship, the values for end quench and standard Eaton test being obtained from the same pieces of steel. In the Eaton test, a quenching temperature of 1525 degrees Fahr. was used, and the samples were vigorously quenched in oil. After this they were cut in half, and the hardness measured at the center of the cut face. The Jominy tests were quenched from 1575 degrees Fahr. In this respect the NE 8620, NE 8720 and NE 8817 steels react the same to hardenability tests as the former SAE steels.

In order to harden fully the cores of the NE 8620, NE 8720 and NE 8817 steels, reheating temperatures of at least 1525 degrees Fahr. should be employed. This conforms with published data of the American Iron and Steel Institute giving approximately 1525 degrees Fahr. as the upper critical or AC_3 point of these steels. This was verified by a series of quenching cycles in which disks ½-inch thick were successively quenched from temperatures in increments of 25 degrees Fahr. starting with 1475 and ending with 1550 degrees Fahr. No increase in hardness was obtained above 1500 degrees Fahr.

A sample of the NE 8744 and one of NE 8949 stetel were likewise tested, and no increases in hardness were obtained above 1475 degrees Fahr. for the NE 8744 steel nor above 1425 degrees Fahr. for the NE 8949 steel. While the former higher nickel steels such as SAE 4620, SAE 3115, SAE 4820 and SAE 2515 steel could be hardened at lower reheating temperatures than the new NE steels, the latter certainly are an improvement over some of the popular first substitute steels resorted to, such as SAE 6120 and SAE 4120, which required reheating temperatures somewhere in the neighborhood of 1550 degrees Fahr., where scale formation becomes a problem.

TABLE V—Relation Between Jominy Test and Standard One Round Eaton Hardenability Test

Steel	Jominy Test at 3/8"	Eaton—Center of 1" Round
NE 8620	C20	C20
NE 8720	C28	C30
NE 8817	C26	C27

Unless the furnace atmospheres are controlled, it is a task to keep decarburization down as well as to avoid the file-soft surfaces or "soft skin" that often occurs with the straight-chromium, chromium-molybdenum and chromium-vanadium steels. Where no grinding of the working surface is done, such as on gear teeth after hardening, the NE 8620, NE 8720 and NE 8817 steels resemble the former SAE 4600 and 4800 series, which were well known for their truly file-resistant cases even under poor hardening conditions. This new series has similarly shown low distortion characteristics typical of the prewar nickel steels.

Reports from several sources so far have encouragingly stated that the NE 8600, NE 8700, NE 8800 and NE 8900 series have given good accounts of them-

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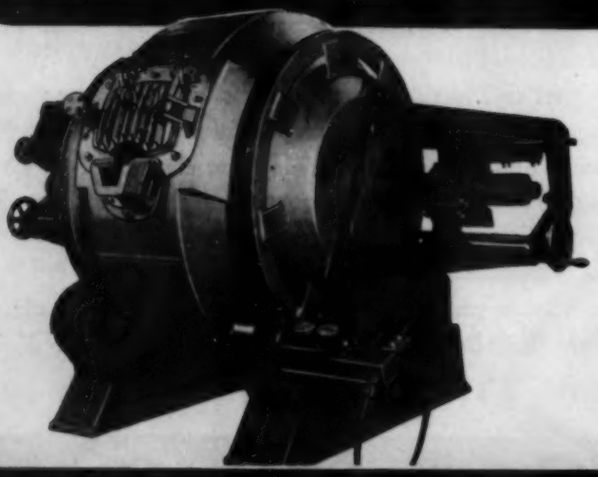

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selves on laboratory dynamometer tests and breakdown tests in the field, which indicates that this series at least is adequate for many uses without fear of experiencing trouble from their adoption. They have their proper application like any of our former steels with which we are familiar, and care is needed perhaps more than ever before to prevent misapplication because of their lesser alloy content.

Welded Caissons

(*Continued from Page* 104)

boundary. According to this arrangement, the entire load was transmitted to the side walls of the dry dock, and the pressure distribution was assumed to vary from zero at the top of the side wall seats to a maximum at the bottom.

With the introduction of the so-called grid-system of framing, in which the horizontal girders were supplemented by a similar series of vertical frames, the analysis became statically indeterminate. The function of the vertical framing is two-fold—to transfer a part of the water pressure from the heavily-loaded lower girders to the more lightly loaded upper girders and to assist the horizontal girders by transmitting a part of the hydrostatic load to the bottom seat.

Fig. 5 is an isometric presentation of the grid or cellular box, consisting of the interior framing with the shell plating removed. The hydrostatic load acting on the box is transmitted to the three supports first by local bending of the various members of the secondary framing and then by bending of the main framing as a whole. For the first part, the problem is rather simple. The shell plating, spanning over the secondary supporting frame, acts as a continuous member to transmit the distributed loading to the supporting stringers. The latter, in turn also bending as continuous beams, transfer the water pressure to chords of the main framing in the form of a series of concentrated loads. The chords, likewise bending locally, carry the intermediate concentrated loads to the main panel points located at the intersections of the vertical and horizontal frames.

New Caisson Design: In preparing a new design of caisson, the available data of the caisson for the last conventional design were utilized both as a guide as well as a basis of comparison. Main features of the new framing included a new cross-sectional outline in the form of a slenderized box that presents a striking contrast to the bulky, barrel-shaped outline of the former design. Other changes consisted of revised girder and frame spacings, elimination of doubleplates from girder flanges and redistribution of material throughout the framing.

The estimated weight of the caisson was 1,950,000 pounds, exclusive of concrete ballast, representing a reduction of 306,700 pounds from the weight of the former design.

Welded Framing: While the design drawings for the new riveted caisson framing were being prepared, the question was raised as to whether the original decision to use riveted construction ought not to be reconsidered in view of the number of new caissons involved and the economies which might be achieved by welding. Up to that time the bureau had not used welding in the fabrication of its floating caissons.

As support for the adoption of welding, it was argued that, since the elastic cellular slab concept adopted in the new design was predicated on rigidity of connections, there was great justification for using the new analysis in welded construction of proved rigidity. To obtain a direct comparison, it was agreed to prepare an alternate design of welded framing and to submit both schemes

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of construction for bids.

Details of Welded Design: The success of any welded design depends greatly on its planning and development as a new and entirely distinct structure, free from the influence of the details of the riveted design which it displaces. With this in mind, in preparing the details of the alternate welded design, the parts for each member girder and frame were carefully selected to provide not only the lightest weight and maximum strength but also the most advantageous section for welding. To this end, generous use was made of serrated channel sections, cold-formed angle sections and wide-flange T-sections. All horizontal girders have a combination T-angle flange section. The small T's, while not needed for strength, were added to provide a landing and backing strip for welding of the horizontal seams of the shell plating. The connections were further improved by substituting two separate fillet welds in lieu of the customary butt weld, thus allowing a tolerance gap between the edges of two adjoining shell strakes, at the same time reducing the possibility of locked-up stresses which might result from long butt seams.

The employment of serrated sections results in a saving in channel material and the use of a minimum amount of welding with sealed connections at the lines of contact with the plating. The flanged sections of the girder and frame chords furnish the required stiffness and stability in flexure, obviating the need of welded legs.

Working Stresses: In determining the amount of welding at the various points, the following unit stresses were used: Fillet welds, 13,560 pounds per square inch; butt welds, tension, 15,600 pounds per square inch; butt welds, compression, 18,000 pounds per square inch; butt welds, shear, 12,000 pounds per square inch. Other details and welding requirements were in accordance with Bureau of Yards and Docks welding specifications 12yb-Supplement No. 1a and 22yb.

The estimated weight of the steel and fittings of the caisson was 1,505,000 pounds or 445,000 pounds less than the weight of the new riveted design and 751,700 pounds less than that of the old riveted design.

Comparative Caisson Costs: Drawings for the two designs were completed early in 1940. Bids were asked for each caisson separately as well as for the two units together. Eight contractors participated in the bidding, the list including the builder of the bureau's last riveted design. Of the eight bidders, four quoted prices for the welded design only, three gave incomplete bids for the riveted design and one submitted bids for both designs. The lowest figures were as follows:

Welded Design:	
One caisson for Navy Yard X	$266,703
One caisson for Navy Yard Y	276,203
Both caissons	522,570
Riveted Design:	
One caisson for Navy Yard X	$355,540
One caisson for Navy Yard Y	366,740
Both caissons	630,600

It is particularly interesting to note that the low figures of the welded group were those of the builder who had actually fabricated the bureau's last riveted caisson mentioned above, the work being sublet to him by the successful bidder of that project.

Fabrication and Construction: The contracts for the two caissons were awarded to the low bidder of the welded design. The caisson being a floating structure, the event marked also the beginning of a large-scale utilization of welding in such structures under the cognizance of the bureau.

By the terms of the specification, the contractor was required to submit the proposed method and order of assembly

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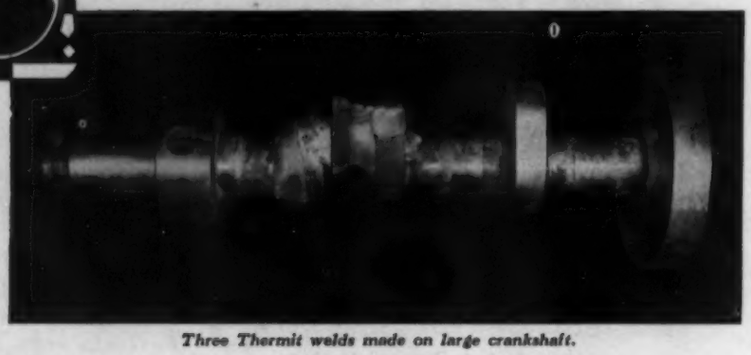

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and sequence of welding for approval before proceeding with the actual fabrication. The submitted procedure in outline form is shown in Fig. 6. The erection being confined to the vertical position of the caisson, the proposed method differed but little from the one envisaged in the design. Another clause in the specification gave the contractor the option to use, upon approval by the bureau, welding details other than those shown on the design drawings. No important changes, however, were proposed to alter the original details.

Fig. 11 shows the placing of the first keel section of the first caisson at the assembly site. Fig. 2 shows the assembled keel section and the lower parts of the main transverse framing. Fig. 1 is a view of the partially assembled end framing, consisting of a part of the stem section, the breast hooks, the watertight bulkhead and the shell plating up to the elevation of girder No. 3. In the foreground a subassembled plate panel with serrated-channel stiffeners can be seen. Fig. 7 is a top view of the partially assembled caisson, showing some details of the interior framing. Fig. 3 shows the completed caisson afloat.

Additional Welded Caissons: As a result of the favorable bids received for welded caissons the bureau decided to use welded construction in all subsequent work. Accordingly on June 1, 1940, contracts were let for the construction of two additional caissons of smaller dimensions, involving 430 tons of steel by welded design. Fig. 10 illustrates an interesting feature of construction of this second group—a keel section subassembled in the shop and ready for shipment to the erection site. Fig. 8 is a view of the caisson at an advanced stage of erection, illustrating the adaptability of welding to high-speed production at the assembly site, in this case showing simultaneous welding by 16 welders (4 inside and 12 outside).

In addition to these four caissons built during the period of July 1940, to January 1942, designs were prepared and contracts were awarded for additional caissons of varying sizes. The total amount of steel required for these new projects is in the neighborhood of 12,000 tons. Some of these caissons have already been completed and are now in successful operation; others are at various stages of completion at fabricating shops or at the assembly sites.

Savings in Cost: One of the first considerations in any project is obviously the cost. The contract prices of the last conventionally designed caisson and the new welded design indicate a maximum cost differential of $122,947 for one caisson. Deducting from this sum $34,110 as a saving due to the improved method of stress analysis, the balance of $88,837 represents the net saving resulting from use of welding. This is a 25 per cent saving. It is equivalent to approximately $118 per ton of steel used. On this basis, the net savings realized from caissons built or presently under contract, involving a total of 14,000 tons of steel, is $1,652,000. Anticipated savings from projected construction in the immediate future, involving some 30,000 tons of steel, is $3,540,000.

Savings in Weight: As stated, weight of steel in the first welded caisson was 751,700 pounds less than the former design. Of this, 306,700 pounds was due to the application of the elastic slab theory to the design. The balance of 445,000 pounds represented the net saving from welding. Expressed in percentage, the reduction from the old design is 33.3 per cent or approximately 0.5-pound per one pound of metal used in the welded caisson. On this basis, the total saving in weight for the caissons under the present construction program is about 4200 tons. That for the projected construction will approximate 9000 tons.

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livery of the last old-type caisson was approximately 18 months. The first welded caisson was contracted for and delivered in about 12 months and the second one 3 months later. With improving technique, shop fabrication is steadily approaching the pace of high production, thus resulting in yet faster production.

Savings in Maintenance Cost: In floating structures, welded construction possesses a distinct advantage in that no caulking is required to provide the required watertightness. Caulking is not only costly but often ineffective, resulting in leakage and corrosion and consequent overhaul and repairs. Welded construction, if properly done, automatically provide watertight seams and thus assures appreciable savings in the cost of maintenance.

Fig. 11—Shop welded keel section of caisson

Added Strength and Stability: Paradoxical as it may seem, the welded caisson of reduced weight is stronger than the heavier design which it displaces. This is due to the fact that its rigidity of connections helps to develop fully the strength of the various sections of the framing. At the same time a part of the savings from the eliminated deadweight connectors as well as from substituted sections of high stress efficiency are utilized in the form of added strength. In addition, the lighter welded caisson requires relatively shallower draft in flotation and has greater stability.

Incidental Benefit: These advantages are in addition to a still greater benefit which cannot be measured by the standards of a world at peace. A part of the savings in steel tonnage was reused in a different form in some of the caissons —as armor plating to provide protection against bombing. Another part made it possible to construct some of the spare caissons now in the process of fabrication, and still another part went into the construction of ships and other combat weapons. These transformed sav-

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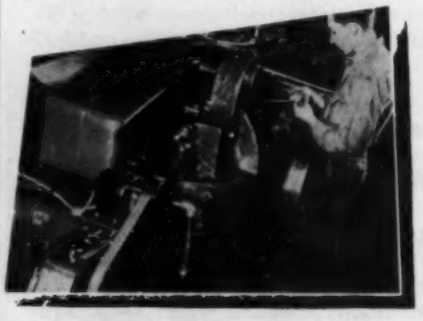

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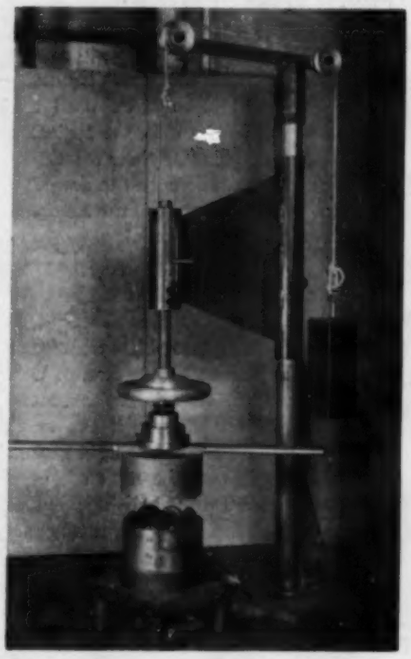
STEEL FASTENERS

ings constitute the real contribution which welding, as applied to Naval dry dock caissons, has made to the violent effort which the United Nations are now making to insure a more secure way of living.

How To Remove Varnish From a Bracket Fit

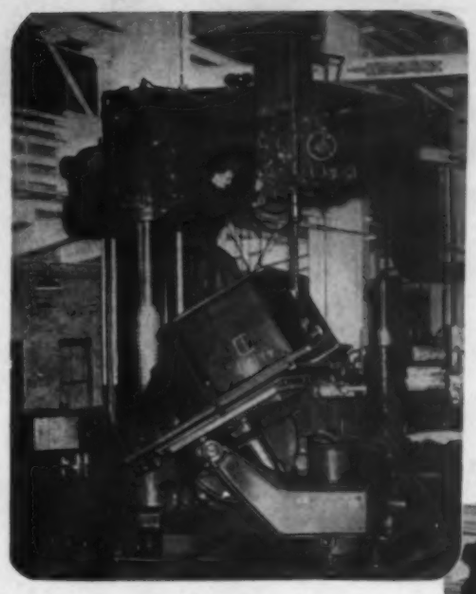
Usually after parts have been dipped in varnish and baked, it is necessary to remove part of the varnish from the metal. This, sometimes, is done by sanding or buffing, but if the parts are identical and in large numbers, other methods may be quicker and more thorough.

At Westinghouse Electric & Mfg. Co., Lima, O., it was learned recently, a hollow mill supported from a stand and counter-balanced for ease of operation is used to remove varnish from the

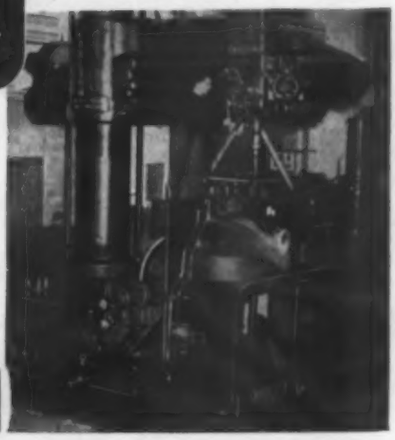


bracket fit of small motor frames. In this instance, the cutter is lowered until a pin in the slide nut engages in the lowest notch in the guide. The cutter then is rotated manually and the desired pressure is supplied by turning a hand wheel. When the bracket fit has been properly cleaned, the pressure is released; the slide nut is disengaged from the pin, and the cutter is pulled upward by a counter-balancing weight.

A shell cutter is required for each frame size. A side clearance on the teeth is omitted to prevent the diameter of the frame fit from being affected. To keep the depth of the cleaned surface constant four of the 12 teeth have no back clearance. A spring under the handwheel cushions the cutter to permit starting on irregular surfaces, compensating for any misalignment.



Designed to revolve and tilt weldments so that all sides can be welded "down hand," C-F Positioners are today being used not only for welding, but for holding and positioning work for many different machining operations. Coming in sizes and capacities to carry work weighing up to 30,000 lbs., adjustable for height and capable of turning or rotating work completely around and tilting it at any angle (up to 135° off horizontal), these versatile positioners are reducing the number of set-ups required for many jobs.



★ ★ *(1) Drilling Angle Hole on side and (2) by tilting Positioner 90° and revolving table, "straight" holes are drilled on all 4 sides and in top. Write for Bulletin WP 22 showing C-F Positioners as used to permit down hand welding on all surfaces of weldment with one set-up.*

CULLEN-FRIESTEDT CO.,
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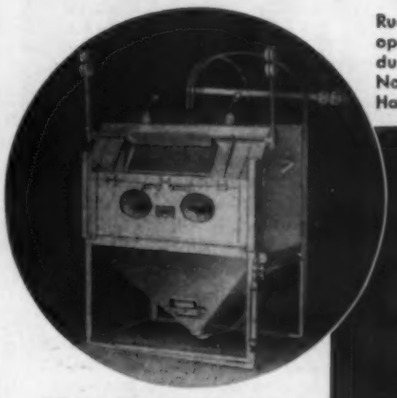
for Defense Production!

Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Eliminate dust, permitting installation anywhere in the plant. No skilled labor required. Sturdily constructed. Handles sand or steel abrasives. Prompt delivery.



RECOMMENDED FOR:

1. **Heat treating plant — removing scale, oxides.**
2. **Aircraft production — cleaning welds, metal preparation.**
3. **Foundries, ferrous and nonferrous — cleaning castings.**

RUEMELIN MANUFACTURING CO.
3882 N. Palmer St • Milwaukee, Wis.

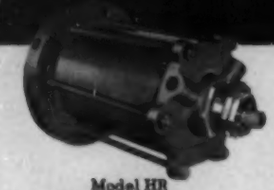
Ruemelin cabinet with door open. Provides quick access for loading and unloading.

RUEMELIN Blast Cleaning Cabinets

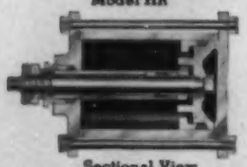
Angle Bender
Built in various sizes
One of many Thomas units to speed production
PRESSES • METAL-FORMING MACHINERY
PUNCHES • SHEARS • SPACING TABLES
FABRICATING MACHINERY
Designed and Built by
Thomas builds equipment for any metal-forming or fabricating need. All are featured by modern up-to-the-minute design and simplicity of operation, and are built with an eye to economy as well as adaptability!
THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

Precision Cylinder Construction

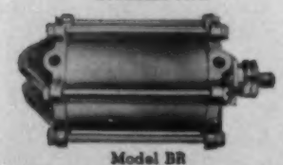
Pays Off in BETTER PERFORMANCE



Model HR



Sectional View



Model BR

Uninterrupted production and maximum use of compressed air power are direct results of Hannifin precision cylinder construction and simple, outside adjustment of piston packing. Hannifin cylinders are bored and then honed, producing a cylinder bore that is straight, round and perfectly finished. Correct adjustment of the soft, graphite treated piston packing is easily made from outside the cylinder, without disturbing piping or other parts.

Hannifin pneumatic cylinders are built in a full range of standard mounting types, sizes 1 to 12 inch diameter, for any length stroke. Single and double-acting types, with or without cushion. Special cylinders built to order. Write for cylinder Bulletin 57-S.

HANNIFIN MANUFACTURING COMPANY
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HANNIFIN PNEUMATIC CYLINDERS

Method Minimizes Errors In Precision Work

Possibility of error in precision lathe work requiring an accuracy of five one hundred thousandths of an inch is now minimized as the result of a pilot-light indicating method developed recently by M. M. Cunningham, foreman, General Electric Co., Schenectady, N. Y.

The method eliminates the human element inherent in the old practice of using a magnifying glass to see when the tool makes contact with the surface to be cut.

In Cunningham's method, electrical contact between tool and work is used to close a light circuit, telling the operator exactly when to set the dial indicator at zero, thus establishing a sure basis for making a cut within the required accuracy of 0.00005 inch.

The tool is brought up to the surface to be cut in the regular manner until it is just about to make contact. From this point on it is brought up very slowly until the pilot light flickers. Very little further movement is required until the light is steady. When it is, the indicator is set at zero. A cut of any desired thickness can then be made with the accuracy of the cut dependent only on the accuracy of the indicator and its reading.

Either an incandescent or a neon indicating lamp can be used for the pilot light. A small transformer is required to reduce the standard 110-volt circuit to 6 volts for the detecting circuit. One line from the transformer is connected to the bed of the lathe, and the other line to the screw shell of the light socket. The center contact of the light socket is connected to a metal strip which makes contact with the lathe tool, being set against the tool when it is locked in the tool post. The tool is insulated from the tool post with a piece of varnished cambric or light cardboard.

This pilot-light indicating method, it is reported, also can be used where the work is stationary, such as on milling machines, by insulating the work from the machine and connecting the center contact of the light socket to the work.

Develops Gum To Stick Paper Labels to Metal

Paper or linen labels may now be stuck to metal products by means of a new special stick-to-metal gum recently developed by Ever Ready Label Corp., 141 East Twenty-fifth street, New York.

According to the company, main reason labels have never found great adaptability in plants producing metal products is the fact that ordinary gumming does not adhere to metal surfaces.

Helpful Literature

1. Large Gas Valves

Wm. M. Bailey Co.—6-page illustrated bulletin on "Mechanical Goggle Valves" describes various sizes of these units for use in conjunction with gas washers, precipitators, boiler plants and blast furnace gas mains. Design features use of no mechanical parts in gas stream and affords positive method of valve-to-goggle plate clamping. Design, dimensions, operation and installation are covered.

2. Conveying Chains

American Manganese Steel division, American Brake Shoe & Foundry Co.—16-page illustrated bulletin No. 742-CN gives complete data on manganese steel chain for conveying and elevating applications. Described are chains for elevators and conveyors, steel industry, dredging, saw and paper mills, drags and special purposes. Elevator buckets, sprocket wheels and welding products are also covered.

3. Industrial Controls

Brown Instrument Co.—64-page illustrated bulletin, "The Technique of Precision Control in Industrial Processes," is designed to acquaint engineers, operators and management with manifold applications of automatic controls to industrial processes. Indicating, recording, controlling and signalling equipment for temperatures, flows, pressures and liquid levels are covered.

4. Welding Accessories

General Electric Co.—32-page illustrated bulletin No. GEA-2704-B presents complete line of arc welding accessories which are designed to make welding safer and easier. Among items described are goggles, shields, head protectors, leather clothing, welding screens, protective paint, electrode holders, clamps, cable connectors, chippers and fillet-weld gages.

5. Time Recorders

Foxboro Co.—4-page illustrated bulletin No. A-321 describes and explains applications of electric and mechanical operation-time recorders. Instruments are used in test engineering, setting job standards, cost accounting and production control. Typical installations are shown. Specifications are given for single and multiple pen instruments.

6. Steel Standards

American Steel & Wire Co.—14 x 18-inch wall chart No. 6235 tabulates composition limits, as well as AISI, SAE and NE numbers for carbon, molybdenum, free cutting, chromium, manganese, nickel, nickel chromium, chromium vanadium, silicon manganese and National Emergency steels.

7. Industrial Equipment

S. F. Bowser & Co.—40-page illustrated, "Industrial Equipment Catalog," presents complete specifications on equipment for filtration and distillation, lubrication, metering, pumping, refueling, storage and dispensing, as well as miscellaneous apparatus for use wherever liquids are handled.

8. Pipe Threading

A. M. Byers Co.—19 by 30-inch instruction chart is entitled, "The Trouble-Shooter for Correcting Threading Ills." Improper threading is shown in large size pictures. Causes and cures for hand and machine threading operations are given. Also listed are "do's and don'ts" to be considered in threading.

9. Welding Positioner

Ransome Machinery Co., Industrial division—4-page illustrated bulletin No. 205 is descriptive of 20-ton capacity welding positioners. In addition to giving specifications on this machine, typical applications are shown. Equipment permits position welding for maximum production.

10. Aluminum Welding

Progressive Welder Co.—4-page illustrated bulletin No. 101 describes new line of "Revers-O-Charge" welding equipment which is designed for welding of aluminum alloys. Both rocker arm and pedestal type welders are covered. Latter has built-in refrigeration unit for electrode cooling.

11. Lighting Equipment

Fostoria Pressed Steel Corp.—8-page illustrated bulletin No. 442 shows typical applications of "Localite" lighting fixtures which provide localized lighting for close, accurate operations in industry. Typical fixtures of both incandescent and fluorescent types are described in detail.

12. Metal Parts Washers

Detroit Rex Products Co.—24-page illustrated catalog, "Detrex Metal Parts Washers," describes various types of washing equipment for use with alkali cleaning compounds, petroleum spirits and emulsion cleaners. Adaptations of equipment for armament and aircraft production are shown and discussed. Cleaning and stripping compounds for metal parts cleaning operations are described.

13. Screw Products

Manufacturers Screw Products — 96-page illustrated catalog and price list No. 14 lists and describes aviation products; machine, cap, set, wood, sheet metal and Phillips head screws; bolts, studs and rods; nuts; stampings; rivets and eyelets; pins; bright wire goods; toggle bolts, anchors and shields; and special screw products. Sectional indexes facilitate use.

14. Industrial Furnaces

Johnson Gas Appliance Co.—4-page illustrated bulletin No. 820 is descriptive of the new No. 820 tempering and drawing furnace which is designed for tempering of tools, dies, non-ferrous castings and small parts; heating aluminum forging and rivets; or any other job requiring temperature range from 275 to 1200 degrees Fahr.

15. Milling Practice

Kearney & Trecker Corp.—136-page illustrated book, "Right and Wrong in Milling Practice," is first of a series of educational books on milling practice. Correct and incorrect procedures relating to setup, operation and maintenance of milling machines; selection, use and care of cutters; keeping house and safe operation are covered in text and through use of sketches.

16. V-Belt Drives

Allis-Chalmers Manufacturing Co.—12-page illustrated bulletin No. B6051-C is designed as aid to selection of correct V-belt drives for wartime applications. List prices, stock sizes, dimensions and construction details are included for all "Texrope" drives. Additional descriptions cover application of "Texrope Vari-Pitch" sheaves and drives and "Vari-Pitch Speed-Changer."

STEEL *Readers' Service Dept.*

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17. Metal Working

Whiting Corp., Quickworth-Whiting division—4-page illustrated bulletin No. QW-106 contains condensed information on rotary shears and attachments, throatless shears, power hammers and stamping trimmers for metal-working applications. Features of machines are shown and operation is explained.

18. Centrifugal Pumps

Worthington Pump & Machinery Corp.—2-page illustrated bulletin No. W-310-B11 presents specifications, ratings and dimensions of type CY, single stage, open impeller, belt or motor driven centrifugal pumps for handling hot or cold water, brine, light oil, drainage, process waste and similar liquids.

19. Resistance Starters

Allen-Bradley Co.—4-page illustrated bulletin No. 640 describes line of resistance starters for manually starting polyphase squirrel cage motors. These units are recommended for loads which must be accelerated smoothly or for applications where starting currents must be kept low to prevent lamp flicker.

20. Plastics

Durez Plastics & Chemicals, Inc.—8-page illustrated bulletin, "Durez Plastics", traces development of plastics from raw product to finished materials. Various types of plastics are discussed and typical applications in finished equipment shown. Properties of various types are covered.

21. Valve Repair

Crane Co.—6-page illustrated folder, "How To Repair Valves", is No. 5 of a series of "Piping Pointers" bulletins. It explains and illustrates various steps to take in repairing leaky gate and globe valves, as well as hints on how to reclaim discarded valves.

22. Fire Truck

Cardox Corp.—4-page illustrated bulletin, "Cardox Airport Fire Truck," is descriptive of machine which carries ample supply of carbon dioxide and dispensing equipment for combating all types of fires. It is particularly designed for airport use.

23. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 861 describes series 861-4B light duty rotary crossed-axis gear finishers for gears ranging from ⅛-inch to 4-inch diameters and up to 1-inch face widths. Complete specifications, applications and design details are covered.

24. Refractories

Basic Refractories Inc.—4-page illustrated bulletin No. 211G is entitled, "Keep the Ends High—and the Rest of the Bottom will Take Care of Itself." Suggestions are included for maintenance of basic open hearth furnaces. Refractories for industrial furnaces are briefly described.

25. Bronze Alloy

Ampco Metal, Inc.—8-page illustrated booklet, "Contribution to Victory", describes pictorially use of "Ampco Metal" in war industries. Booklet contains views of various types of war equipment containing this aluminum bronze alloy, as well as pictures of weapons of war made by machine tools of this material.

26. Sheet Metal Operations

E. W. Bliss Co.—52-page booklet is entitled, "Computations for Sheet Metal Workers." Various types of power presses are described. Also covered are principles underlying such metal operations as blanking and shearing, drawing and reducing, ironing, coning, sizing and forging.

27. Tool Salvage

Eutectic Welding Alloys, Inc.—4-page illustrated folder, "A New Welding Process To Speed Victory", covers the subject of salvaging tools and machine parts. Pictures of actual jobs done show how salvaging saves thousands of dollars worth of scarce tools yearly and keeps production uninterrupted.

28. Resins

Carbide & Carbon Chemicals Corp.—20-page illustrated bulletin, "Vinylite Resins—Their Forms, Properties and Uses," discusses various types of resins which are available in rigid sheets, flexible sheets and films, molding and extrusion compounds, adhesives and base resins for surface coatings. All data are in readily usable form.

29. Broaching

Colonial Broach Co.—20-page illustrated bulletin No. 942 contains answers to frequently asked questions on broaching. Also given are recommendations for correct broach sharpening. Important factors which contribute to maximum broach life are discussed. Shown are standard broaching machines.

30. Inspection Magnifier

Boyer-Campbell Co.—4-page illustrated folder, "Super Sight", shows how this product combines magnification and properly directed light for close inspection work, fine assembly and precision machining. It is available in 4-inch and 5-inch units or double lens units for increased magnification.

31. Rubber Guide

B. F. Goodrich Co.—30-page illustrated booklet No. 2-8981-GA lists applications and properties of many types of products for industrial and aeronautical purposes using natural, synthetic or reclaimed rubber. Booklet is divided into eleven indexed sections. Cross-sectional drawings add to clarity of presentation.

32. Flow Meters

Cochrane Corp.—56-page illustrated catalog No. 3010 is new edition on complete flow meter line. Besides describing electric, mechanical, linameter, ring balance, liquid level and weir meters, catalog also covers new two-pen electric flow recorder, improved low pressure electric meter and ultra high pressure ring balance meter.

33. Heat Insulation

Eagle-Picher Sales Co.—8-page illustrated bulletin on "Eagle Super 66 Plastic Insulation" presents applications and characteristics of this material for heat insulation purposes for temperatures up to 1800 degrees Fahr. Advantages, installation and heat savings are covered.

34. Bearing Metals

Magnolia Metal Co.—8-page illustrated bulletin, "Magnolia Bearing Metals," describes various lead-base metals which are claimed to have long wearing qualities on shock loads, heavy sustained pressures and general service. Included are bearing maintenance data and recommendations for 135 different types of machinery.

35. Resistance Welding

P. R. Mallory & Co.—80-page illustrated, "Resistance Welding Data Book," covers theory and practice of resistance welding. Sections include fundamentals of resistance welding, materials to be welded, engineering tables, and data on hard, high conductivity alloys for resistance welding applications.

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Film Refining Process

(*Concluded from Page 96*)

uses. This shows that no unusual strains are placed on the materials used. As a matter of fact heavier loads are sustained in similar cylindrical refractory linings used for large scale production of cast-iron pipe centrifugally cast by the sand spun process, also gun barrels cast in the same manner.

The molten iron or steel and molten refining slag are simultaneously and continuously fed into the refiner through the hole in the steel cover plate. The flow of these molten materials is controlled, either from the pouring ladles or through proper nozzles in the machine pouring boxes, to correspond to the rate of production required of 1 to 3 tons per minute. The refined steel and used slag are continuously separated and collected by means of a simple 2-way collecting box set at the receiving end of the machine.

(*Concluded in next issue*)

Electric Metal Makers Guild Plan Meeting

CHICAGO

Plans for a regional conference to be held in this city next March are being made by the Electric Metal Makers Guild Inc. Groundwork for the event was laid at a meeting of the Chicago section of the Guild with national officers at the Union League Club, Dec. 5.

Herman Schultz, superintendent of electric furnaces, South Works, Carnegie-Illinois Steel Corp., Chicago, heads a committee appointed to arrange for the conference and prepare the program. Other members of the committee are A. J. Scheid Jr., metallurgist, Columbia Tool Steel Co., Chicago Heights, Ill., and B. J. Aamodt, superintendent, National Malleable & Steel Castings Co., Cicero.

The Chicago meeting, which was attended by more than 20 members in this area and adjacent territory of the midwest, was conducted with Burt W. Reynolds, melting foreman, Burnside Steel Foundry Co., Chicago, and head of the Guild's Chicago section, as chairman. Discussed at length at afternoon and evening sessions was the organization's policy and program for next year.

Harry F. Walther, electric furnace superintendent, Timken Roller Bearing Co., Canton, O., is national president of the Guild. James Sweitzer, superintendent, Sivyer Steel Casting Co., Milwaukee, is vice president; and John E. Arthur, superintendent of melting, Park Works, Crucible Steel Co. of America, Pittsburgh, is secretary-treasurer.

Annual convention of the Guild will be held at the Onesto hotel, Canton, O., June 4-5.

FOR ALL DOWNHAND WELDS

. . . a tilting range of 135 degrees from horizontal

With a tilting range of 135 degrees from horizontal, Ransome Positioners provide the means to weld DOWNHAND any and all welds no matter how complicated the piece to be welded.

Reports from many users indicate valuable time savings . . . which means more welding production in a given time over methods formerly used. Give us your welding production problems—our engineers will supply the answers.

Capacities from Light Duty Hand-Operated to 20 ton Motor-Operated

Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY

start

right

URGENCY of production requires precision fit in less time! By peeling Laminum shim adjustments you speed accurate assembly . . . and make possible the same easy adjustments in field service.

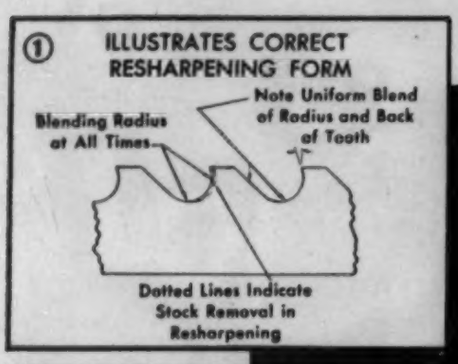
Laminum shims (.003 or .002 in. laminations bonded into a solid unit easy to peel) are cut to your specifications.

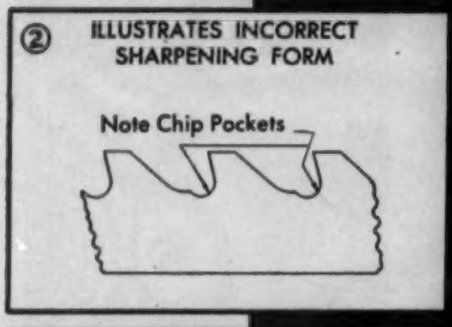
Stock shim materials obtainable from mill supply dealers. (Write us for sample and illustrated shim application file-folder.)

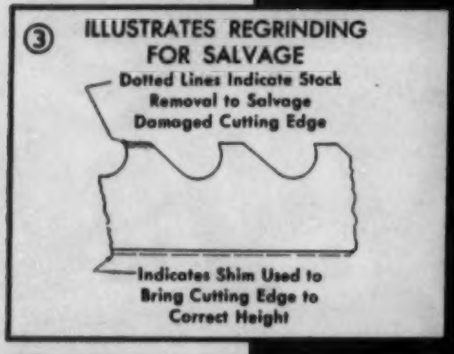
Laminated Shim Company
Incorporated
87 Union Street Glenbrook, Conn.

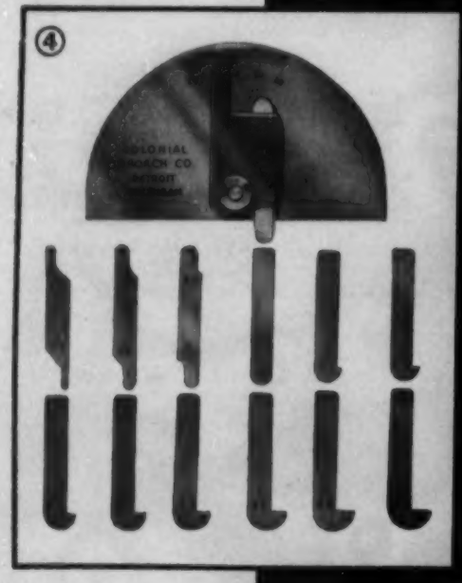
it's **LAMINUM**

THE SOLID SHIM THAT peels FOR ADJUSTMENT


① ILLUSTRATES CORRECT RESHARPENING FORM
Note Uniform Blend of Radius and Back of Tooth
Blending Radius at All Times
Dotted Lines Indicate Stock Removal in Resharpening




③ ILLUSTRATES REGRINDING FOR SALVAGE
Dotted Lines Indicate Stock Removal to Salvage Damaged Cutting Edge
Indicates Shim Used to Bring Cutting Edge to Correct Height



How to get more production with your Broaches------

2. BY PROPER SHARPENING

(a) Any marked departure from the original size and form of teeth in resharpening broaches will result in incorrect cutting action. Have the manufacturer supply you with a blueprint for use as a guide.

(b) Always blend the radius of the broach when sharpening teeth. Fig. 1 shows how to successively resharpen a broach.

(c) Don't sharpen a broach in the manner illustrated in Fig. 2. The pockets at the base will prevent chips from clearing the teeth, slow up production and possibly break broach teeth.

(d) Where surface broaches can be adjusted for height, it is permissible to sharpen broaches as shown in Fig. 3. When this is done, care must be taken to maintain proper stepping, backing off and tooth depth.

(e) It is always advisable to check the radius at the bottom of the tooth with simple radius gages as shown in Fig. 4, to keep broaches at peak of efficiency and prevent broach damage from incorrect sharpening.*

(f) Play safe: Don't use makeshift equipment to sharpen broaches.**

*Available in sets at a nominal price from Colonial.

**Colonial Universal Broach Sharpening Machines are equally adaptable to sharpening of both flat and round broaches.

colonial BROACH COMPANY

Broaching Machines — *Broaches-Broaching Equipment*

DETROIT . . . . . U. S. A.

Steel Buying Activity Awaits New War Needs

First quarter PRP allocations to be spur to active ordering. . . Armament readjustment brings more cancellations. . . Ore season ends with tonnage above quota. . . Scrap improvement holds

DEMAND
Ordnance shift slows buying.

PRODUCTION
Unchanged at 99½ per cent.

PRICES
Steady at ceilings.

ANNOUNCEMENT of Production Requirements Plan quotas for first quarter, scheduled to be made by Dec. 15, is expected to stimulate placing of orders for steel materials.

Many consumers have been holding back orders until they receive their allocations, to avoid a repetition of experiences of fourth quarter, which resulted in many suspensions and cancellations. Some improvement in buying has been noted in products where deliveries have been most extended, such as sheets and bars. Further delay has been considered unwise, possibly jeopardizing chances of getting favorable position on mill books. In large rounds and flats most users have not delayed placing their orders, in view of the pinch in these products.

Readjustment in the armament program continues to cause some cancellations and larger placements under PRP may not serve to balance this. At the same time specifications against long-term contracts are heavy. Shifting of emphasis in the war program has affected principally ordnance items, including tanks, guns and shells. Some changes also are being made in contracts for steel landing mats, regarded as a result of rescheduling in advance of the Controlled Materials Plan.

• • •

Deliveries are still deferred on most products although there has been some easing during the past fortnight on small bar rounds, which may be obtained in six to eight weeks on top ratings. On large rounds best promises are about 15 weeks. Most sheet sellers have little tonnage for delivery against top priorities before the middle of February, in hot and cold-rolled and galvanized. An exception is noted in the case of one eastern mill which can promise some galvanized tonnage for late January shipment as low as AA-3. Structural shapes are much easier and four to six weeks delivery is available down to and including AA-5 rating.

War Production Board has released some locomotive and freight car orders which, had been frozen earlier in the year, as a start toward the equipment desired by the carriers for 1943.

Ore transportation on the Great Lakes has come to an end and the goal of 92,000,000 gross tons has been exceeded, through the exact figures for the season are not yet available. Ore on hand at furnaces and lower lake docks is ample for steelmaking until the 1943 season opens. All records were broken in 1942 and preparations are under way for a larger movement in 1943 to support an expanded steelmaking program if the war continues through that period. Additional carriers will be in service and trip capacity will be considerably larger.

American Iron and Steel Institute reports steelworks had in stockpiles Oct. 31 reserves of 3,254,000 gross tons of scrap, sufficient for 3½ weeks at the current rate of consumption. This is about 1,460,000 tons more than they held April 1 but about 700,000 tons less than reserves as of Jan. 1, 1941. The latter was about equal to six weeks requirements at the rate of operation then prevailing. Present supplies put the industry in a much better situation than at any time for several months and with considerable tonnage in yards awaiting preparation future supplies cause less apprehension. Salvage drives continue to be pushed, tending to maintain the flow, recent collections being of better grade.

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Steelmaking last week continued at virtual capacity, 99½ per cent, the only bar to a higher rate being necessity for renewing open-hearth brickwork, scrap supply having faded from the picture as a limiting factor. Changes in district rates were few and for the most part producers held at the rates of the previous week. Chicago mills returned some open-hearth capacity and gained ½-point to 101 per cent, the highest in three weeks. Wheeling also gained ½-point to 86½ per cent. Cleveland declined 1½ points to 92½ per cent. Rates were unchanged as follows: Pittsburgh 99 per cent, eastern Pennsylvania 96, Buffalo 90½, St. Louis 94, Cincinnati 92, Youngstown 97, Detroit 95, Birmingham 95 and New England 92.

Steel ingot production holds near the high mark of recent months and in November made the largest output in history for a 30-day month, with 7,184,560 tons. It failed to equal the all-time high made in October but was well above production in November last year. Average per week in November was 1,674,723 tons, slightly below the 1,712,159 tons averaged per week in October.

Composite prices of steel and iron are steady and unchanged from levels prevailing for some time under Office of Price Administration ceilings. Finished steel composite is $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	Dec. 12	Dec. 5	Nov. 28	One Month Ago Nov., 1942	Three Months Ago Sept., 1942	One Year Ago Dec., 1941	Five Years Ago Dec., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.90
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.40

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 12, 1942	Nov. 1942	Sept. 1942	Dec. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron

Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2 Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.00
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	21.215

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.30 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethhlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel		Iron	
In.	Blk.	Galv.	Blk.	Galv.
⅛	56	33	24	3½
¼ & ⅜	59	40½	30	10
½	63½	51	34	16
¾	66½	55	38	18½
1-3	68½	57½	37½	18

	Lap Weld Steel		Iron	
In.	Blk.	Galv.	Blk.	Galv.
2	61	49½	23	3½
2½-3	64	52½	28½	10
3½-6	66	54½	30½	12
7-8	65	52½	31½	14½
9-10	64½	52	33½	18
11-12	63½	51	32½	17
			28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine	
½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off
Stove Bolts	

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts	U.S.S.	S.A.E.
Semifinished hex.	62	64
7/16-inch and less	59	60
½-1-inch	57	58
1⅛-1½-inch	56	..
1⅝ and larger		
Hexagon Cap Screws		
Upset 1-in., smaller	64 off	
Milled 1-in., smaller	60 off	
Square Head Set Screws		
Upset, 1-in., smaller	71 off	
Headless, ¼-in., larger	60 off	
No. 10, smaller	70 off	

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
7/16-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

	Price Per Net Ton
Beehive Ovens	
Connellsville, furnace	*$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.63	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.76	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.60
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick (Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00
Fluorspar	

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Soft Bars	Hot-Rolled Strip Bands	Hot-Rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.06	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.59	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.86	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	..	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Washington, D. C.	3.95	4.10	4.45	3.80	3.80	5.35	3.60	....	....	....	4.03	....	....
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.35	4.90	6.70	4.90	4.60	7.15	4.95	7.15	5.95	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	..	....	..
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	.	8.00	7.85	8.65
Los Angeles	4.60	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham, Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco; 1 to 99, Los Angeles; 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50
less $7 freight allowance	

Manganese Ore

Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	Chemical Composition Limits, Per Cent: Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	.....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8339	.35-.42	1.30-1.60	.20-.35	.....	.....	.20-.30	.75	15.00	1.25	25.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.60	.15-.25	.75	15.00	1.25	25.00
NE 8715	.13-.18	.70- .90	.20-.35	.40-.60	.40-.60	.20-.30	.80	16.00	1.30	26.00
NE 8949	.45-.50	1.00-1.30	.20-.35	.40-.60	.40-.60	.30-.40	1.20	24.00	1.70	34.00
NE 9255	.50-.60	.75-1.00	1.80-2.20	.....	.	.....	.40	8.00	....	.....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.	.....	.65	13.00	....	.....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.40	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.40	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.60	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

						ELECTRIC FURNACE AND FOUNDRY GRADES								
				Low Phos. Grades										
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	2 ft. and less	1 ft. and less	Cut Auto Scrap 3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	..	13.85	13.85	....	....	....	....	....	....	....	....	....	....	..
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	2 ft. and under	18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.
Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.
Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. **Blast Furnace Grades** prices refer to mixed borings and turnings, shoveling turnings, and cast iron borings.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 134

Most sheet sellers have little tonnage for delivery against top ratings before the middle of February. This applies to galvanized as well as to hot and cold-rolled sheets, though one eastern mill has some galvanized tonnage available for late January shipment on ratings as low as AA-3.

Sheet buying has slackened and some improvement is noted in deliveries, though not marked. Distributors' stocks are in better balance, although some suppliers were late in shipping fourth quarter quotas, some tonnage included in directives being delivered in December. Orders for first quarter delivery are light, notably for cold-rolled, and most new buying is against scattered specified lots to meet new war requirements. Restricted building operations and limitations on their use have reduced requirements for galvanized.

Plates . . .

Plate Prices, Page 135

While the year as a whole is off for most plate sellers, due to limitations on certain types of construction and on tank fabrication and to reshuffling of certain procedure under the allocation system, some sellers report a recent improvement. There has been a greater channeling of orders from smaller shipyards and an improvement in railroad maintenance and repair buying; also larger purchases by oil companies. Jobbers are taking in more plates than early in the fall.

In the export field, a Portuguese shipyard is reported requiring for 25,000 tons of plates and shapes, principally plates, although there is question if the government will permit this purchase. With Spain apparently manifesting a more friendly attitude toward the Axis than toward the United Nations and with the possibility always of Germany endeavoring to go through Spain to attack Gibraltar, it is believed by trade interests that shipment of such a tonnage to Portugal, next door to Spain, would not be considered wise.

Rails, Cars . . .

Track Material Prices, Page 135

Orders are beginning to be released slowly against the program of 20,000 cars to be built for domestic lines in the first half of next year. Some trade interests estimated that fully 75 per cent of the cars approved by War Production Board will involve contracts frozen last spring.

One order approved by WPB recently for delivery in 1943 involves 1000 gondola cars for the Union Pacific, to be built by Pullman-Standard Car Mfg. Co., Chicago. This order was originally placed some time ago and then held up, pending a revision in specifications. Instead of all steel, these cars will now be of composite construction.

No new car orders for domestic lines were placed in November, for the second month in succession, according to a recent survey. Consequently total domestic freight car awards for the first 11 months aggregated 25,893 cars, against 113,093 in the corresponding period of 1941; 59,708 in the same 11 months of 1940; and 57,740 in the same period 1939. Further comparisons follow:

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March	4,080	8,074	3,104	800
April	2,125	14,645	2,077	3,095
May	822	18,630	2,010	2,051
June	0	32,749	7,475	1,324
July	1,025	6,459	5,846	110
Aug.	0	2,668	7,523	2,814
Sept.	1,863	4,470	9,735	23,000
Oct.	0	2,499	12,195	19,634
Nov.	0	2,222	8,234	2,650
10 mos.	25,893	113,093	59,708	57,740
Dec.		8,406	7,181	35
Total		121,499	66,889	57,775

December will show some activity, for already the Monongahela Connecting has been given authority to build in its own shops sixty five 120-ton all steel gondolas and twenty 100-ton all steel hoppers. The Akron, Canton & Youngstown has also had authority to place what is believed to be a new order for fifty 40-ton steel frame box cars, the contract going to the Mather Stock Car Co., Chicago.

Ordered tentatively, subject to WPB approval, are 100 seventy-ton composite gondolas and 25 seventy-ton composite flats for the Norfolk & Western. Pressed Steel Car Co., Pittsburgh, is scheduled to build the gondolas and the Greenville Steel Car Co., Greenville, Pa., the flats.

Several inquiries are pending, the

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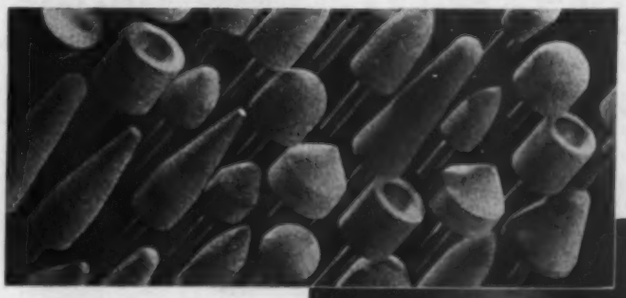

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Several locomotive orders have been placed, subject to approval by WPB. The Atchison, Topeka & Santa Fe has thus tentatively placed twenty 4-8-4 freight locomotives with the Baldwin Locomotive Works, Eddystone, Pa.

Also pending Washington approval are two 1000-horsepower diesel-electric engines for the Chicago, Milwaukee, St. Paul & Pacific, five 1000-horsepower Diesel-electric switch engines for the Lehigh Valley, eight 1000-horsepower diesel-electric switchers for the Western Pacific, and two 1000-horsepower diesel-electric switchers for the New York, Susquehanna & Western, all to American Locomotive Co., New York.

Definitely placed, with full WPB approval, are two 1000-horsepower diesel-electric switch engines for the Richmond, Fredericksburg & Potomac, awarded to the American Locomotive Co., and one 1000-horsepower diesel-electric switch engine for the Nevada Consolidated Copper Corp., to Baldwin Locomotive Works.

On certain locomotive orders placed recently the equipment had been practically built, with WPB having given approval for the construction. Thus quick delivery can sometimes be made to an approved buyer.

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Pipe . . .

Pipe Prices, Page 135

Merchant steel pipe deliveries to distributors under directives have generally been completed; replacements are for the most part confined to higher priorities on PD 83g. While some smaller jobbers were relieved by one or two car lot deliveries under directives, pipe inventories of larger distributors are not large and are unbalanced in sizes. Consumer demand is slower, as are direct shipments, with scattered tonnage lots going to service distributing depots. Cast pipe inquiry is light and deliveries are better on lower ratings.

Structural Shapes . . .

Structural Shape Prices, Page 135

Demand for structural shapes continues to lag. Deliveries are available in six weeks on ratings down to AA-5. Award of a bridge for the Alaskan highway provided tonnage for Belmont Iron Works, Philadelphia, and Bethlehem Steel Co. Pending decision on priority no award has been made on a railroad bridge for the Pennsylvania at Washington, requiring 5000 tons, on which bids were opened Dec. 1.

Pig Iron . . .

Pig Iron Prices, Page 136

Some merchant pig iron producers find demand is not as pressing as recently and the situation seems easier. This conclusion is reached after survey of revised PD69 forms filed for January allocations. Slight decline in requirements of smaller foundries, noted recently, seems to have spread to larger melters in some areas.

Review of requests filed for January deliveries indicates little tonnage will be left in the A-10 classification. Most melters filed requests in the upper ratings, from AAA down to AA-2x, which constitutes the top group in the revised form.

Scrap . . .

Scrap Prices, Page 138

That the steel industry is in much more comfortable position in regard to scrap supply than for several months, which has been apparent for the past few weeks, is confirmed by a survey by the American Iron and Steel Institute. This agency finds steelmakers had in reserve Oct. 31 a total of 3,254,000 gross tons of scrap, which was about 1,400,000 tons more than they had April 1, but about 700,000 tons less than what might be called normal, the tonnage on hand Jan. 1, 1941. Since Nov. 1 deliveries have been sufficient to balance or perhaps exceed consumption and incoming scrap continues to arrive. Supply for approximately a month probably is on hand, on the average.

Cost of collection and preparation is coming to be a large factor in the situation as labor conditions become acute and this may have a deterrent effect in future.

Dealers in the Buffalo area failed to

bid on an accumulation of city scrap, claiming a bid that would allow them a profit would be so low as to cause criticism. They asserted labor was not available to transport it to yards or to prepare it there.

Chicago melters are increasing reserves slightly and steel production no longer depends on receipts. Some consumers are refusing an undue proportion of light scrap but this is not creating alarm. Supply is not yet sufficient to make the position secure for future months.

Sudden winter onset in the St. Louis area has slowed scrap handling. Melters there are well supplied for four to six weeks except in the case of two mills, which are close to the bottom of their reserves.

Some eastern mills are holding back shipments and some of their normal supply is being allocated to plants further west. A lot from Camden, N. J., recently was sent to Butler, Pa., and some scrap from northern New Jersey is said to have been sent as far west as Lorain, O. Such long shipments are expensive to the buyer and are held to a minimum.

Warehouse . . .

Warehouse Prices, Page 137

That demand and supply on a larger assortment of hot-rolled steel products are in better balance with mills is indicated by improved replacement deliveries to warehouses. Cold-finished and alloys are tight, with demand heavy. However, slightly heavier deliveries of small diameter cold-finished rounds are noted in some cases. On the whole, alloys excepted, warehouses are taking in more steel; cold-finished and alloys will be the last to improve or become easier.

Demand for some products from warehouses has slackened, but smaller inquiry is confined to hot-rolled steel, notably structurals, while restrictions on use of galvanized sheets and light building activity has eased requirements.

Miscellaneous demand for nails, bolts, staples and other fastenings is heavy, particularly from the country. Quantities available is limited. Hoops and bands are in better supply but are being absorbed promptly by users. Heavy orders from country dealers for fencing and accessories from country dealers are largely unfilled.

For first quarter supplies to warehouses of extended ratings, PRP and scattered will be geared to the current system directives. Controlled Materials Plan will become fully effective in second quarter when all deliveries to jobbers will be under directives. Alloys and much cold-finished have been based largely on directives for some time, but under CMP total tonnages will be fixed after revisions, depending on prime contractors and war requirements in the respective areas, with definite schedules for deliveries each month.

Bolts, Nuts, Rivets . . .

Bolt, Nut, Rivet Prices, Page 135

Eastern bolt and nut manufacturers continue to have difficulty getting delivery on larger size rounds, particularly sizes over 1¼ inch. While there have been some cancellations and curtailments of orders, due in part to the drastic cut in PRP quotas in the current quarter and to realignment of the country's war program, particularly as it applies to construction, most bolt and nut producers have substantial backlogs and could produce at a higher rate were steel supplies, in the larger diameters, more readily available.

Tin Plate . . .

Tin Plate Prices, Page 135

Under the mill quota system, tin plate producers have been advised as to how much they can roll in January. There appears little doubt but that the tonnage will be much heavier than in the current month. In December tin plate production has been greatly restricted. Under the PRP for the fourth quarter, quotas when finally issued were much smaller than consumers had been given reason to believe they would be. In fact, they were advised to go ahead in the first month on a much larger than average basis for the quarter as a whole, as it later developed. Consequently, they had relatively little tonnage left for December.

Tin plate consumers generally have not as yet received their quotas under PRP for the first quarter and inasmuch as there is still no little confusion as to what type of plate they can use for some products and moreover, they still are not sure of what tonnage they are going to get in any event, there is little ordering

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at the moment. However, tin plate production will undoubtedly be stepped up sharply after the turn of the year, so as to build up necessary stock, which normally are started in December or late November.

Iron Ore . . .

Iron Ore Prices, Page 137

Movement of iron ore on the Great Lakes has reached its end, with the total above 92,000,000 gross tons. At 7 o'clock of the morning of Dec. 7 loadings at upper lake ports passed that season total with five or six additional cargoes to be loaded. Duluth-Superior harbor, greatest ore shipping port in the world, closed Monday noon, Dec. 7 and other ports ended their seasons slightly later.

Lake Superior Iron Ore Association has issued preliminary figure for the season's movement, subject to later revision, placing tonnage at 92,076,781 gross tons. The last cargo cleared the harbor at Marquette, Mich., Dec. 9.

Canada . . .

Toronto, Ont.—Brisk demand prevails for practically all lines of steel. Orders from war consumers are pouring in, but there has been noticeable slackening in inquiries from civilian and non-essential users. It is now becoming apparent that civilian consumers of steel materials, are beginning to realize that no steel is available for their use, and the fact that some mills have been accepting their business on an if, as and when delivery basis, is no indication that they will receive delivery. In fact, producers have no option in this respect but on most lines of steel are under direct supervision of the steel controller and are shipping only against his orders. It is reported that mills are carrying thousands of tons of non-essential orders on their books and it is doubtful that any of these commitments can be taken care of for the duration. Demand for steel on war account is expanding much more rapidly than is production, despite the fact that Canadian mills are maintaining output at almost 99 per cent capacity.

Demand for plate and sheets is increasing with specially heavy call reported for quarter-inch plate. Shipbuilding continues to absorb most Canadian output of plate, as well as the greater part of imports. It is stated that Canada is endeavoring to increase deliveries of plate from the States for urgent war needs. Inquiries during the week include those from two or three base metal mines in Ontario and Quebec, and as these come under top priority rating no delay will be made in shipments. Plate and sheets also have brisk call from motor vehicle makers and the electrical industry.

Steel in Europe . . .

London—(*By Radio*)—Demand for boiler plates is increasing in Great Britain and structural fabricating shops find all their facilities employed in production of assemblies for war work. Hematite pig iron is scarce and orders are increasing.

Alleges Carnegie-Illinois Violated Scrap Regulations

OPA filed in federal district court in Chicago last Thursday petition asking that Carnegie-Illinois Steel Corp. be enjoined from "violating price control regulations in buying scrap in Chicago area." It charges the corporation since Feb. 21, 1942, has purchased above ceiling prices, has improperly diverted scrap from electric furnaces and has failed to keep accurate records."

John F. Manierre, regional OPA enforcement attorney, said the action is the first of its kind against a large steel company and the government hopes to halt upgrading by enjoining buyer as well as seller.

A company spokesman stated the complaint does not indicate particular violations, but since price ceilings were established every effort has been made to observe the spirit of the regulations, and to make them applicable to a practical procedure so vital to maintaining highest possible steel rate. "There has not been and never will be any deliberate violation of regulations in any Carnegie-Illinois plant," he said.

Ships on the Production Line

ACP Products save time and step-up efficiency in Navy and private shipyards

Just as ACP DEOXIDINE helped make the mass production of automobiles possible . . . and as ACP RODINE boosted the efficiency and volume of steel production . . . so, today, these and other ACP Products are helping build the vital bridge of ships.

RODINE in pickling baths, saves both steel and acid and prevents pitting and burning of plates. It minimizes acid embrittlement, making plates easier to machine, bend and drill. DEOXIDINE is the time-tested acid cleaner. On aluminum ventilating ducts and superstructure sections, it removes oil, eradicates corrosion and neutralizes corrosion-producers. LITHOFORM chemically coats galvanized surfaces to prevent the characteristic blistering and peeling of paint.

All three have long served their apprenticeship with the growth of American Industry.

•

Among the other ACP Products are: FLOSOL, an exceptional soldering flux for steel, brass, copper, tin, terne plate, zinc and galvanized iron; KEMICK, a chemical paint that holds to and protects metal surfaces even when heated to redness; CUPRODINE copper coats steel by simple immersion.

These and other ACP Products are available to you in speeding production of the vital bridge of ships. The experience of the ACP laboratories in metal treating and finishing processes is at your service.

AMERICAN CHEMICAL PAINT CO.
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AMBLER . . . PENNA
ACP
DETROIT, MICH., 6335 Palmer Ave., E.
CANADIAN BRANCH
WALKERVILLE . . . ONT

Nonferrous Metal Prices

Dec.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-10	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets	
Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15
Tubes	
High yellow brass	22.23
Seamless copper	21.37
Rods	
High yellow brass	15.01
Copper, hot rolled	17.37
Anodes	
Copper, untrimmed	18.12
Wire	
Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper	
No. 1 heavy	9.25-10.00
Light	7.25- 8.00
Brass	
No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50
Zinc	
Old	4.75- 5.00
New clippings	6.00- 6.50
Aluminum	
Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25
Lead	
Heavy	4.75- 5.25
Mixed babbitt	5.25- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75
Tin and Alloys	
Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50
SECONDARY METALS	
Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50
MAGNESIUM (12 pound rod, 4 in. diam.)	
99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

Contractors Selected for East Leg of "Big Inch" Pipeline

Selection of 12 contractors for the job of constructing the 857-mile eastward extension of the Texas-East Coast War Emergency Pipeline were announced last week.

Full-scale operations are planned right through the winter. Completion of the Illinois-East Coast extension from Norris City, Ill., to the New York-Philadelphia refining areas is expected by mid-summer.

The line will be constructed of 24-inch pipe as far as Phoenixville Junction, Pa., with two 20-inch branches extending from that point to Bayway-Bayonne, N. J., and to Philadelphia.

The twelve contractors receiving letters of intent are, in the order of their contract sections east from Norris City, Illinois: (Spreads, or work sections, numbered 1 through 8 are on the Texas-Illinois leg of the 24-inch line.)

Spread No. 9, Sheehan Construction Co., Tulsa, Okla.; 10, Ray Smith, El Dorado, Kans.; 11-12, Anderson Bros., Tulsa, Okla.; 13, C. S. Foreman, Kansas City, Mo.; 14-15-16, Bechtel & Dempsey, San Francisco, and Tulsa, Oklahoma; 17, William Bros., Tulsa, Okla.; 18, O. C. Whittaker Co., Ft. Worth, Tex.; 19, I. C. Little, Dallas, Tex.; 20-21-22, Oklahoma Contracting Co., Dallas, Tex.; 23, Midwestern Engineering & Construction Co., Tulsa, Okla.; 24, Jones & Brooks, Oklahoma City, Okla.; 25, Exeter Construction Co., Camp Hill, Pa.

Manning Table

(*Concluded from Page 48*)

person in the nation should perform, as nearly as possible, the task for which he

for PRODUCTION
despite difficulties
Use KENNAMETAL* tools
STYLE 11
STYLE 12
KENNAMETAL THE All American CARBIDE
KENNAMETAL tools bore, face, and turn more pieces per tool and more steel per regrind than do ordinary carbides, especially when machining high Brinell steels and interrupted cuts.
KENNAMETAL'S greater hardness, greater transverse rupture strength, and greater modulus of elasticity permit it to efficiently complete the job illustrated at the left. This entailed machining a cast steel rack pinion (C .25/.35; Ni 1.50/2.00; Cr .60/.90; 90,000 lbs./sq. in. tensile strength). It was necessary to turn, bore, and face over interruptions and sand holes; speed was 155 ft./min., feed .032", depth 1/4 to 5/16", using soluble oil coolant.
KENNAMETAL Grade KM was chosen for these operations and its performance was 5 to 1 over the tools previously used on this job.
Write for the new KENNAMETAL Catalog, No. 43, for complete information regarding these superior steel-cutting tools.
*Invented and Manufactured in U. S. A.
McKENNA METALS Co.
200 LLOYD AVE., LATROBE, PENNA.
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
Exclusive of Canada and Great Britain

is best equipped. The War Manpower Commission and the Selective Service System both recognize this principle."

It will take a few months to get the manning tables in operation. In the meantime, looming inductions may create situations in some plants which require immediate action. To offer a temporary solution in such cases, the Selective Service directors in each state now have the withdrawal and replacement schedule forms which are available to such employers upon request. These schedules will provide a basis for withdrawals and replacements pending completion of the manning tables and their distribution.

These schedules consist of a plant summary and a replacement list, normally made from data developed in preparation for the manning table. They are in two parts. The first part is made up of a survey of the personnel in the plant involved, arranged generally by job titles and Selective Service statuses. The second part is a replacement list upon which are listed by name the male employes who must be replaced so they can enter the armed forces.

The first step in preparing such a schedule is to obtain in respect to such male employe the following information: (1) job title, (2) date of birth, (3) local board number and address, (4) Selective Service order number and classification and (5) family relationships.

Next, the employer must list all of the jobs by plant, department and other operating unit. Opposite each job the employer will list under the following headings the total number of workers engaged: (1) Number of women, (2) Number of men not to be considered for replacement (Those with minor children, those physically unfit, those over 38 and under 18), and (3) Those to be considered for replacement (single men and married men without children).

The employer will then list by name the employes subject to induction whom he is prepared to replace. Those who are to be replaced in the first month will be listed first, followed by those in the second month, etc. Those men for whom deferment is to be requested for six months or more will be listed under "6 months to 12 months" and those for whom deferment is asked for a year will be listed last under "more than one year." These facts, which will provide an impersonal and impartial yardstick, will be considered in determining the order of listing:

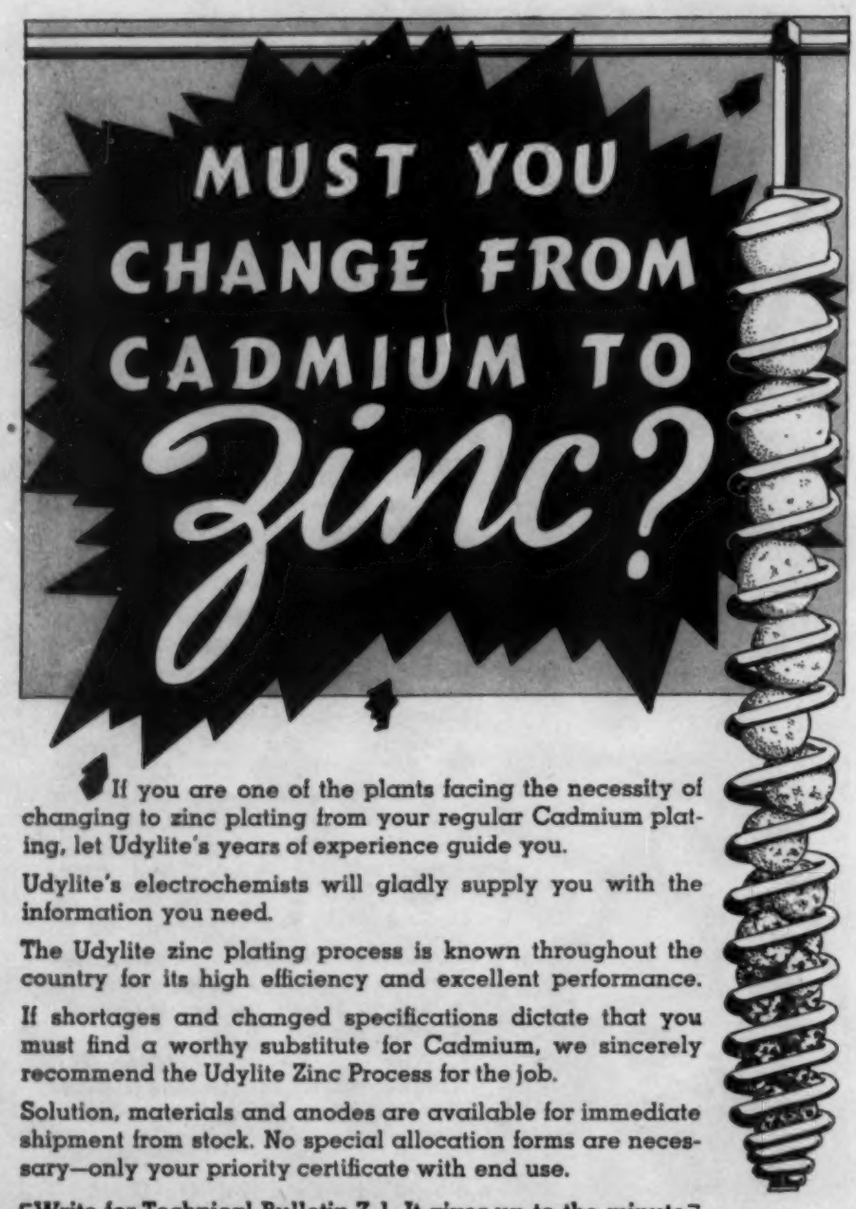
1. Required period of training.
2. Previous and existing periods of deferment.
3. Availability for military service (single men will be listed ahead of married men).
4. Selective Service order numbers (those with the lowest order numbers usually will be listed first).

When a schedule has been thus prepared and approved by the state Selective Service director, it shall, unless revised, continue in operation for six months.

These schedules, once completed, will show to the employer and to the employe the order in which each individual concerned will be available for induction.

At the end of the six-month period the replacement schedule may be extended for another six-month period with the approval of the state director of Selective Service.

If, however, the employer has filed a replacement schedule which is not based upon a manning table, the regional WMC director may decide that the employer should be required to make out a manning table before submitting a new replacement schedule. In such a case the WMC regional director will notify the state Selective Service director of his belief at least 60 days in advance of the expiration of the schedule in effect. The state director will inform the employer of the WMC action. If the employer declines to prepare a manning table, the



If you are one of the plants facing the necessity of changing to zinc plating from your regular Cadmium plating, let Udylite's years of experience guide you.

Udylite's electrochemists will gladly supply you with the information you need.

The Udylite zinc plating process is known throughout the country for its high efficiency and excellent performance.

If shortages and changed specifications dictate that you must find a worthy substitute for Cadmium, we sincerely recommend the Udylite Zinc Process for the job.

Solution, materials and anodes are available for immediate shipment from stock. No special allocation forms are necessary—only your priority certificate with end use.

[Write for Technical Bulletin Z-1. It gives up-to-the-minute information on the change-over from cadmium to zinc.]

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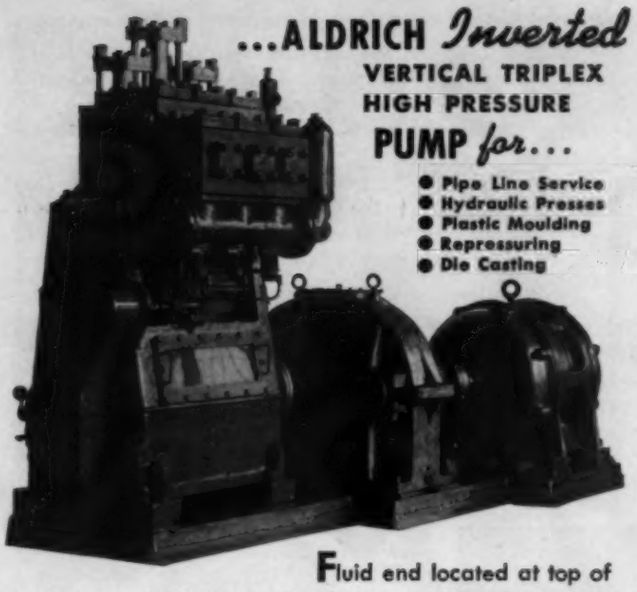

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VERTICAL TRIPLEX
HIGH PRESSURE
PUMP *for...*

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- Hydraulic Presses
- Plastic Moulding
- Repressuring
- Die Casting

Fluid end located at top of pump frame. Totally enclosed with provision for outside packing and proper lubrication under all operating conditions. Crankshaft extends through crankcase for direct coupling at floor level to gear motor or speed reducer. For pressures to 8350 p. s. i. and capacities to 200 g. p. m. Ask for Data Sheet 66.

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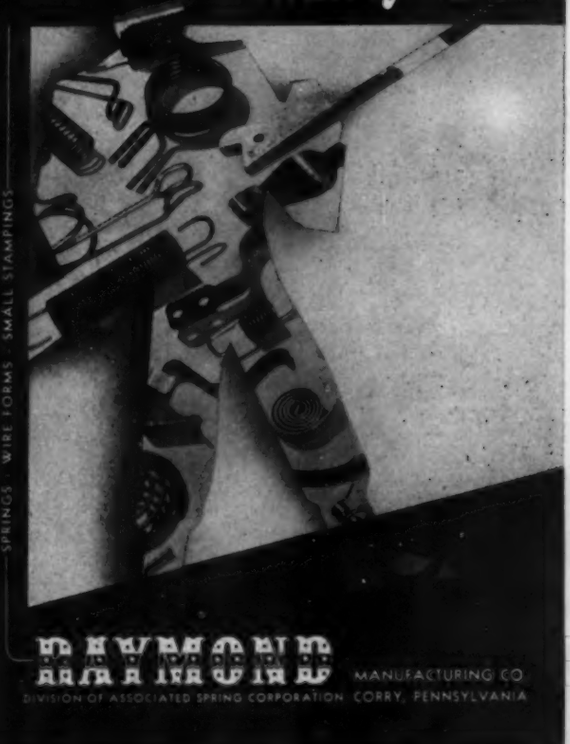
Minute Man of '42



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DIVISION OF ASSOCIATED SPRING CORPORATION · CORRY, PENNSYLVANIA

"*General* GEAR"
IS A FIGHTER TOO...

He's the guy that makes the Jeeps Jump... He's also the BIG-WORKS in the tank, battleship or airplane... in fact he's the BIG-WORKS in any Power-saving or Power-driving machinery. HE'S GOTTA BE GOOD. Our organization of many years of Gear Making Experience is going to keep him fighting and to help keep all of us on top.

A SET OF PLANETARY GEARS

CONTINUOUS-TOOTH HERRINGBONE GEAR AND PINION

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GEAR ASSEMBLY FOR HELICAL WORM GEAR SPEED REDUCER

SET OF WORM GEARS

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state director may refuse to renew the employer's schedule.

In case the state director should feel the existing schedule should be renewed despite the WMC action, he will so notify the director of Selective Service who in turn will submit the matter to the chairman of the War Manpower Commission for a ruling.

The question of deferment on occupational grounds in each individual case will continue to rest with the local board and board of appeals. Local boards, however, will give serious consideration to the replacement time which has been determined under an accepted replacement schedule. The employe retains his right to appeal.

In cases where an employer does not fill out either a manning table or a replacement schedule, deferments and inductions will be ordered by the local Selective Service boards in the same manner as in the past.

Wartime Conference

(*Concluded from Page* 73)

others are de-emphasized.

"A very large portion of manufacturing capacity either cut down or idle will be converted. In the ordnance department's mechanical time fuze program, released plant capacity has gone to the air forces. The ordnance department is your customer and the Army is our customer. We are directed by higher authority what to procure and in what quantities and within what time period. Due to the fluidity of war we are often directed to make more in less time or less in more time."

At a press conference conducted earlier in the day, General Campbell, who recently returned from conferences with our field commanders in England and North Africa, declared that American ordnance is the best it has ever been in the history of this country and is equal or superior to anything the Germans have. The M-4, or General Sherman, tank is being called the "answer to the tankman's prayer". This, plus the 105-millimeter self-propelled mount, was largely responsible, he said, for getting Rommel on the run.

General Campbell and also Brig. Gen. Thomas S. Hammond, chief of the Chicago Ordnance District, pointed out that because of the curtailment in the production of tanks, guns, shells, and other ordnance items, in line with the newly adopted emphasis, some plants will be obliged to scale down operations and lay off men, while they are being converted and otherwise being tooled up to turn out aircraft and naval products. At the same time, they made it clear that large plants will take the heaviest share in stop orders, and small plants the lightest.

Former Ambassador Grew told his audience that the United States has not in the past and does not now fully appreciate the power of Japan. While that nation over the past ten years prepared its resources for war, we were complacent, and to an extent we still remain complacent.

He asserted that we are engaged in fighting something infinitely more dangerous than a military machine. We are faced with a restless, devouring militarism which has grown to such proportions that nothing short of complete extermination of the system can remove its menace to free peoples. In mentioning some of our nation's past misjudgments, Mr. Grew said his purpose is to prevent in the future so self-centered a concept of our own freedom that we underestimate the enemy and overestimate our moral and physical security.

Sterling Morton, secretary, Morton Salt Co., Chicago, was installed as president of the Illinois Manufacturers' Association for his second term. Others assuming office were: H. G. Myers, Gardner-Denver Co., Quincy, Ill., first vice president; Howard Goodman, Goodman Mfg. Co., Chicago, second vice president; and E. F. Mansure, E. L. Mansure Co., Chicago, treasurer.

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SPEED TREAT STEEL

A MEDIUM HIGH CARBON OPEN HEARTH PRODUCT

—because . . .

Speed Treat machined faster with better threads

Speed Treat increased production 60%

Speed Treat eliminated warpage during machining

Speed Treat saved $25.00 per ton of steel used

Ductility Plus Machinability (170 SFPM)

In this "all-out" war effort Monarch Steel is co-operating 100%. We're helping to "keep 'em rolling" with Speed Treat Steel.

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THE FITZSIMONS COMPANY

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★ HANDY LYON

Hydraulic Elevating Table

Convenient Hydraulic Foot-Pedal Control

For Die Handling, Transferring Heavy Parts, Leveling Work, and Positioning

Use this new LYON Hydraulic Elevating Table for all sorts of shop work—it's easy-to wheel about from job to job. Handy for moving dies . . . transferring heavy parts from machine to workbench . . . leveling extended work . . . positioning parts in assembly. And it's all operated *hydraulically*. Convenient foot-pedal control leaves users' hands free, makes it safer to use. Complete stability on a wide, firm base. Write us *today* for prices! Ask for Circular No. 124.

LYON Hydraulic Welding Positioner

360° Revolving Top — Elevates a Full 14"

Sturdy—dependable—this LYON positioner has a 2000 pound capacity. 30" x 30" top that both lifts and pivots. Complete foot-control at all times . . . fully hydraulic operation that keeps joints to be welded within operator's easy reach for real efficiency. Write now for Circular No. 129.

LYON-Raymond Corporation

Formerly LYON IRON WORKS *Established 1840*

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FITTINGS AND HOSE *Meet Vital Needs*

On plane—on ship—on tank—on truck—on machine equipment—wherever power, fuel and oil lines must be kept functioning—Weatherhead fittings and hose meet vital demands of industry.

BRASS TUBE FITTINGS

A complete line of tube service parts made from extruded brass rod free from porosity. Inverted, S. A. E. and compression types with square finish that makes installation easy.

FLEXIBLE FUEL LINES

Oil-proof—gasoline-proof—vibration-proof. Supplied as complete assemblies or in lengths with wide variety of easily attached fittings.

PACKLESS VALVES

Leak-proof; quick acting; sturdy; low overall height; natural grip hand wheel; full capacity openings; excellent for fuel lines.

ERMETO SAFETY FITTINGS

For tubes of any metal. Hold up beyond the burst strength of the tube itself. Provide safe, strong, dependable tube joints. Easily connected and disconnected. No flaring, soldering, welding or threading required.

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Tell us the Weatherhead products in which you are interested and we'll send complete details.

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MADE TO SOLVE YOUR PROBLEMS

Call on Hubbard's long experience and skill in developing and manufacturing parts like these, to accomplish the results you are after in those various design and production problems.

Send in your drawings, or describe your problem. Your inquiry will bring real assistance and the advantages of long experience.

M·D·Hubbard Spring Company

447 CENTRAL AVE., PONTIAC, MICH.

Mirrors of Motordom

(*Concluded from Page 64*)

positioned on both sides of a horizontal conveyor line on which the work travels and on which it is securely locked during the cutting cycle.

The South Bend installation is unique in that it comprises three batteries of these machines, position of the work being changed before it enters succeeding batteries. The first battery automatically performs 35 operations; then the head is turned 90 degrees on the index plate to which it is bolted after being located accurately. The second battery runs through a cycle of 79 separate operations, following which the piece is turned upside down and fed into the third battery of machines which has 19 operations, the tools feeding through a large hole in the base of the index plate.

The complete machine is better than 175 feet long and has 50 operating stations. When in full operation it handles approximately 130 cylinder heads at a time. All told, the batteries have 162 tools, including 36 drills, 35 reamers, 15 mills, 30 taps and 46 special tools.

Essentially, the Flying Fortress engine comprises the two-piece crankcase, bolted together through internal flanges, to which are bolted nine alloy steel cylinder barrels through a total of 250 mounting stud holes. Cylinder heads are shrunk on the barrels, by heating the heads to 600 degrees and screwing them on while hot. Bushings are fitted into the heads by immersing them in an alcohol solution at 10 degrees below zero temperature and sliding them in place while cold. Pistons are of forged aluminum alloy, finned on the inside to improve cooling and buffed to a mirror finish all over. Inner surfaces of the cylinder barrels are nitrided, action of the nitriding gas being localized by electrotinning the entire barrel and then grinding off the tin where the nitrided surface is desired.

Crankshaft, an alloy steel forging machined, heat treated and ground to a mirror finish, carries integral dynamic balancers on each counterweight, an ingenious Wright development which provides vibration dampening without increasing weight of the engine. Main bearing journal also is nitrided.

Weighing 1315 pounds, dry, the engine is built up from some 8000 separate parts, or roughly 3300 piece parts. After initial assembly, it is given a test run for four hours under varying speed conditions, including 90 minutes at 95 per cent rated speed; then follows the usual teardown and inspection, followed by reassembly and the "red" test run for another four hours.

Sealed for Shipment

It is interesting to observe the precautions in sealing an engine for shipment. Small vials of silica gel, with perforated ends, are placed in spark plug holes, oil lines and other points where air might seep to the engine interior. This gel is blue in color when dry and as it absorbs moisture it turns pink. A humidity chart is placed in each engine package to indicate the danger point in color of the gel. Cloth bags of silica gel are scattered over the top of the engine as it rests flat before boxing. A pliofilm envelope ($9 apiece incidentally) is drawn over the engine and it is lowered into a wooden crate and sealed for shipment. The pliofilm envelopes and bags containing silica gel are returned once the engine is uncrated for service and they can be dried out and used over.

This, briefly, is a hasty review of some of the highlights of this great plant. Naturally a complete description cannot be presented in this limited space. There are about 1100 machine tools in operation, more being delivered. Lighting is supplied by 6000 fluorescent fixtures, walls being entirely windowless. The floor of the plant is built up of 1½-inch strips of hard maple about 14 inches in length, with tongue-and-groove joints.

Use of LUMNITE for Refractory Concrete Limited to Essential War Needs

THE distribution of LUMNITE is now under definite restriction in order to aid the War Production Program. Since November 1, careful control over shipments has been aimed at placing LUMNITE for essential war uses only.

Our customers and friends will understand the important reason for this. High-grade bauxite ore is urgently required for the production of metallic aluminum. It is also the principal raw material used in making the LUMNITE which is essential for Refractory and Insulating Concrete.

So that bauxite can be conserved and LUMNITE in sufficient quantities can be supplied for war needs, every pound of LUMNITE must work harder. We ask the patriotic cooperation of every customer in helping to distribute LUMNITE where it will do the most good in winning the War.

LUMNITE is held available for . . .

1. **Refractory and Insulating Concrete, or structural concrete exposed to high temperatures in plants engaged in war work.**
2. **Linings or coatings for protection of steel or other critical war materials against heat.**
3. **Other purposes when use of other available material will result in loss or delay of essential war production.**

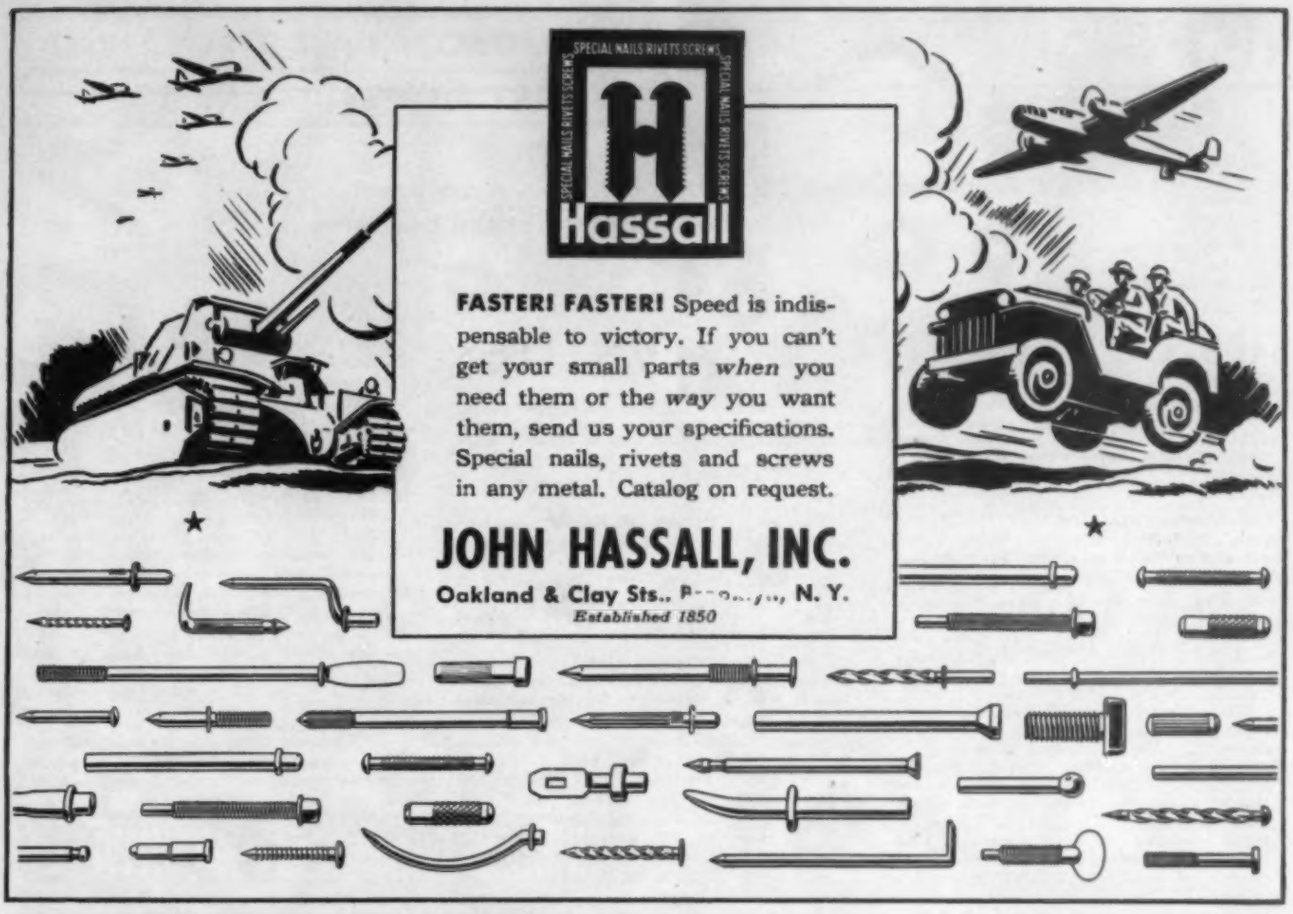
Each specific order, however, will be considered and approved separately on the basis of need and on actual purpose of use in your plant or your product.

In line with this restricted sale, we offer the help of our Representatives in making most efficient use of LUMNITE. If you have any questions regarding the availability of LUMNITE, drop a line to the address below.

THE ATLAS LUMNITE CEMENT COMPANY

[United States Steel Corporation Subsidiary]

Chrysler Building, New York City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SPECIAL NAILS RIVETS SCREWS
FASTER! FASTER! Speed is indispensable to victory. If you can't get your small parts *when* you need them or the *way* you want them, send us your specifications. Special nails, rivets and screws in any metal. Catalog on request.
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Established 1850

READY-POWER
EQUIPPED ELECTRIC TRUCKS
IT'S POWER that COUNTS
MORE WORK IN LESS TIME
For new or existing electric trucks we manufacture a complete line of Gas-Electric Power Units—not complete trucks. Write for information mentioning type of new trucks contemplated or make and type now operated.
FOR NEW OR YOUR PRESENT TRUCKS
THE READY-POWER CO.
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"HERCULES" (RED-STRAND) WIRE ROPE
"HERCULES" (Red-Strand) Preformed Wire Rope can help you keep production in high gear. Its easy handling, smooth spooling, and long life insure maximum hours of work for each pound of steel used. It saves while it serves. Available in both Round Strand and Flattened Strand Constructions.
We would be glad to have you write for further particulars.
"HERCULES" (RED-STRAND) WIRE ROPE
MADE ONLY BY
A. Leschen & Sons Rope Co.
WIRE ROPE MAKERS • • ESTABLISHED 1857
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NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Keefer-59-1: Pennsylvania manufacturer seeks subcontracting facilities for end cap, two inches long, 1⅝-inches diameter. Made from steel, WDX 1020, 112, 1314, 1315, or 1335 cold-drawn. Internal threading operation. Quantity, 50,000 to 100,000 pieces monthly. Prime contractor to furnish materials. Equipment, multispindle automatic screw machines. Prints at Philadelphia office.

Keefer-59-2: Pennsylvania manufacturer desires subcontracting facilities for adapter, length ½-inch, diameter 2 $\frac{11}{16}$-inch. Made from cold or hot-rolled steel WD 1115. Internal threading operation. Quantity, 1000 per day. Equipment, multi-spindle automatic screw machine. Prints at Philadelphia office.

Roystuart-63-1: New Jersey corporation requires 600,000 pins at 60,000 per month. Equipment required, centerless grinder, abrasive cutoff wheel, cadmium plating. Tolerance, .005. Dimensions, .106 O.D. x .340 length. Material, steel, SAE 1035. Material can be furnished by prime or subcontractor.

Roystuart-63-2: New Jersey corporation requires 300,000 plugs at 30,000 per month. Equipment required, four-spindle automatic screw machine and hand screw machine, spindle size 1¾-inch; bench-type drill press; cadmium plating. Tolerance, .005. Threads NC and NS, No. 2. Dimensions, 1.650 O.D. x 2.10 length. Material, steel, SAE 1112. Material by either prime or subcontractor.

Roystuart-63-3: New Jersey corporation requires 300,000 sealing collars, at 30,000 monthly. Equipment, single-spindle ⅝-inch automatic screw machine, bench-type drill press, cadmium plating. Tolerances, plus or minus .010. Threads, ⅝-inch-16 NC-2-LH-INT. Overall dimensions, ⅝-inch O.D. x .200 width. Material can be furnished either by prime or subcontractor.

Roystuart-63-4: New Jersey corporation requires 300,000 arming screws at 30,000 monthly. Equipment, ⅝-inch single-spindle automatic screw machine, cadmium plating. Tolerance, .005 threads, ⅝-inch-16NC-2-LH-EXT. Overall dimensions, .375 O.D. x 3.30 length. Material SAE 1112 steel, furnished either by prime or subcontractor.

Roystuart-63-5: New Jersey corporation requires 300,000 arming vanes at 30,000 per month. Equipment, 20-ton punch press, ¾-inch spindle; automatic or hand screw machine; drill press and tapping machine; arc welder, $\frac{1}{16}$-inch rod. Tolerance, .005. Threads NC 2. Overall dimensions, 3½-inch O.D. x 1½-inch high. Material furnished by prime or subcontractor.

Roystuart-63-6: New Jersey corporation requires 300,000 striker sleeves at 30,000 per month. Equipment, automatic and hand screw machines, 1-inch spindle; bench-type drill press; cadmium plating. Tolerance, .002. Overall dimensions, .895 O.D. x .80 length. Material SAE 1112 steel furnished by prime or subcontractor.

Roystuart-63-7: New Jersey corporation requires 300,000 fuse bodies at 30,000 per month. Equipment, 2¼-inch six-spindle automatic screw machine; No. 2 chucking turret lathe or hand screw machine; drill press; tapping machine. Tolerance, .005. Threads, No. 2 fit. Overall dimensions, 2.25 O.D. x 4.15 length. Material, SAE 1112 steel furnished by prime or subcontractor.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 3054: Breech block. WD No. 4640 steel, which is furnished on AA1 priority. Equipment, shaper or mill, vertical mill, sensitive drill. Order is for 20 per day.

Job No. 3055: Housing. WD No. 4640 steel, which is furnished on AA1 priority. Equipment, shaper or mill, horizontal boring mill or turret lathe, sensitive drill, tapper, H.D. drill, slotter. Order is for 20 per day.

Jobs No. 3354 to 3364: Automatic screw machine capacity required for 100,000 each of eleven parts, of duralumin, copper silicon and cold-drawn steel. Other equipment, marking machine. Priority, AA1.

Job No. 3455: Spur gear shaft. Material, A16754 steel, which is furnished. Equipment, hand screw machine; horizontal mill, two operations; hobber; external and centerless grinder. Order is for 5000 on AA1 priority.

Job No. 3456: Disc driven ("C" motor clutch) Material, X1020, X1314 or X1315 steel, which is furnished, 1 $\frac{11}{16}$-inch O.D. Equipment, hand screw machine, lathe with $\frac{7}{16}$-inch collet; normalize; lathe; copper plate; hobber; heat treating; centerless grinder. Order is for 10,000 on AA1 priority.

Job No. 3457: Shaft (driven "D" clutch). SAE x 1020, x 1314 or x 1315 steel, which is furnished, 1 $\frac{13}{16}$-inch O.D. Equipment, hand screw machine; lathe with $\frac{7}{16}$-inch collet; normalize; copper plate; hobber; heat treating; external grinder. Order is for 10,000 on AA1 priority.

Job No. 3460: Takeoff retractable hook mechanism. SAE No. 1035 steel, which is furnished, ⅝-inch O.D. Equipment, hand screw machine, ½-inch collet; mill, three operations; centerless grinder; cadmium plate. Order is for 2500 on AA1 priority.

Job No. 3461: Jack screw. Material, A16775-J steel, ⅝-inch O.D., which is furnished. Equipment, hand screw machine, two operations; sensitive drill; lead screw threader; nitride. Order is for 25,000 on AA1 priority.

Job No. 3605: Tee. (flared tube with pipe thread on side). Aluminum alloy or steel. Equipment, hand screw machine, three operations. Order is for 6888 of which 1000 are scheduled for immediate delivery. Priority is AA1.

Job No. 3609: Machining operations only on carrier for stationary gear. WD No. 1015 cold-rolled steel stampings are furnished on A-1-a priority. Equipment, H.D. drill. Order is for 1,000,000 on schedule of 20,000 per day. Sample and prints at Detroit office.

Job No. 3615: Machining operations only on upper bearing. Bronze material is furnished on AA1 priority. Equipment, turret lathe; sensitive drill; tapper; mill; thread hobber. Order is for 500 per month, delivery to start as soon as possible.

Job No. 3606: Adapter, flow divider (flaps). Material, 1¼-inch hex x $\frac{11}{16}$-inch aluminum alloy. Equipment, screw machine; H.D. drill; tapper; anodize. Order is for 10,000 of which 500 is required at once. Priority is AA1.

Job No. 3566: Bevel housing, upper half. ASTM 47-33 castings. Equipment, planer or shaper; H.D. drills, 14 holes; sensitive drill, seven holes; tapper, seven holes; mill; boring mill. Machining operations only. Castings and forgings are furnished. Quantities 300 to 800, depending on production facilities.

Job No. 3567: Sprocket hub. SAE No. 4640 steel forging. Equipment, vertical boring mill or 24-inch turret lathe, two operations; hobber, 18-inch; sensitive drill; mill; tapper, external threader. Jobs No. 3566 and 3567 are typical of seven jobs by contractor seeking subcontracting facilities for machining operations only, all materials furnished.

Job No. 2939: Lower rear idler bevel gear. AMS 6250 steel. Equipment, hand screw machine, 1 $\frac{13}{16}$-inch O.D.; H.D. drill; key seater; copper plate; bevel gear generator; heat treat; bevel gear tapping; gear tester; internal grinder. This job is typical of some 40 jobs on AA1 priority, quantities high on some jobs. Production requirements start now and run to Oct. 1, 1943.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-29: Gear cutting machine work. Six sizes. Diametral pitches, 20, 32 and 48 standard, 48/60 stub. Teeth, 8, 12, 16, 64 and 70. Material, special steel, equivalent of SAE 4615, supplied by prime contractor. Quantity, 1500 to 10,000 at 150 to 1600 per week. Also from same prime contractor 50,000 steel jack screws, ⅝-inch diameter by 7 inches long. Weekly requirements 5000. Reference 1-a-370.

SC-30: Automatic screw machine work for a series of machines having $\frac{7}{16}$ to ⅝-inch diameter bar capacity (B & S machine preferred), also hand screw machines for second operation. About 100 items involved. Material, mostly brass, some aluminum, not furnished by prime contractor. Tools for B & S machine furnished by prime contractor. Only those concerns able to handle a considerable portion of this work will be considered. Reference 1-a-374.

Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:

Display No. 318: Centerwise screw. Material, cold-rolled steel, furnished by prime at cost. Prime will consider one or more sources to produce. Prime will furnish first set of tools to get started. Production, 10,000 to 80,000 daily. Dimensions, 3 x 16 x 2 inches. Equipment, $\frac{7}{16}$-inch bar capacity six-spindle Gridley automatic screw machine. Tolerance, .002. Prime contractor, AC Spark plug Division, General Motors Corp., Flint, Mich., phone 3-0067, attention A. S. Fuhrman.

Display No. 70: Front plate. Material, die casting furnished by prime, who also will furnish fixtures, gages and tools. Prime requests No. 3 W & S turret lathe. Quantity, 20,000. Dimensions 2½ x 3½ inches. Equipment, 1½-inch bar capacity turret lathe; No. 1 vertical milling machine or vertical

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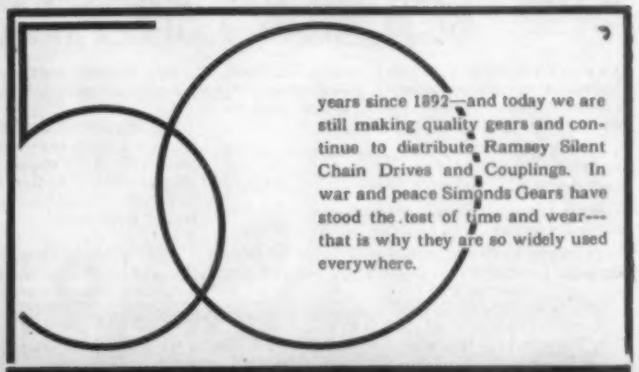

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profiler hand miller. Tolerance, .002. Prime contractor, Bell & Howell Co., 1801 Larchmont, Chicago; telephone, Bittersweet 6510; attention C. S. Davis.

Display No. 190: Body elevating screw shafts. Material, WDX 1335 cold-drawn steel, furnished by prime contractor, who also will furnish fixtures, gages and tools. Quantity, 4500 each of three items at 250 each item per week. Thread, special Acme type, 2½ threads per inch. Equipment includes 1⅛-inch bar capacity universal turret lathe; 1⅛-inch collet capacity cone head engine lathe, 10 x 30 inches; ⅛ x 20-inch capacity deep drilling machine; thread miller disc cutter 24-inch centers; cylindrical grinder 22-inch centers. Prime contractor Pullman-Standard Car Mfg. Co., P.O. Box 31, Hammond, Ind., attention B. H. Bradley.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

200 tons, ammunition dump, McAllister, Okla., for United States Navy, to Robberson Steel Co., Oklahoma City, Okla.; Brown-Bellows, contractor.

200 tons, stringer assemblies, new plant of Republic Steel Corp., Chicago, to Mississippi Valley Structural Steel Corp., Decatur, Ill.; James Stewart Corp., Chicago, contractor.

SHAPE CONTRACTS PENDING

5000 tons, bridge for Pennsylvania railroad at Washington; bids opened Dec. 1, award delayed by determination of priority.

5000 tons, bridge for Pennsylvania railroad at Washington; bids opened Dec. 1, award delayed by determination of priority.

PLATES . . .

PLATE CONTRACTS PLACED

700 tons, kiln sections for Vulcan Iron Works, Wilkes-Barre, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

CAR ORDERS PLACED

Akron, Canton & Youngstown, 50 forty-ton steel frame box cars, to Mather Stock Car Co., Chicago; WPB approval granted.

Monongahela Connecting, sixty-five 120-ton all steel gondola cars and twenty 100-ton all steel hopper cars, to own shops; authority granted by WPB.

Norfolk & Western, 100 seventy-ton composite gondolas to Pressed Steel Car Co., Pittsburgh, and 25 seventy-ton composite flat cars, to Greenville Steel Car Co., Greenville, Pa., subject to WPB approval.

Union Pacific, 1000 fifty-ton composite gondolas, to Pullman-Standard Car Mfg. Co., Chicago; this is a revision of a previous order calling for all steel construction; order approved by WPB.

CAR ORDERS PENDING

Colombian National Railways, Colombia, S.A., 75 small capacity box cars, bids asked.

Denver & Rio Grande Western, 200 seventy-ton flat cars, bids asked.

LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, twenty 4-8-4 freight locomotives, to Baldwin Locomotive Works, Eddystone, Pa., subject to approval of WPB.

Chicago, Milwaukee, St. Paul & Pacific, two 1000-horsepower Diesel-electric switch engines, to American Locomotive Co., New York, subject to WPB approval.

Lehigh Valley, five 1000-horsepower Diesel-electric switchers to American Locomotive Co., New York, subject to WPB approval.

Nevada Consolidated Copper Corp., one 1000-horsepower diesel-electric switcher, to Baldwin Locomotive Works, Eddystone, Pa., authority granted by WPB.

New York Susquehanna & Western, two 1000-horsepower Diesel-electric locomotives, to American Locomotive Co., New York, subject to WPB approval.

Richmond, Fredericksburg & Potomac, two 1000-horsepower Diesel-electric switchers, to American Locomotive Co., New York, authority granted by WPB.

Western Pacific, eight 1000-horsepower Diesel-electric switchers, to American Locomotive Co., New York, subject to WPB approval.

LOCOMOTIVES PENDING

Central of Georgia, eight 4-8-4 freight locomotives, contemplated.

Nashville, Chattanooga & St. Louis, seven to ten 4-8-4 freight locomotives, contemplated.

BUSES BOOKED

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OHIO

ASHTABULA, O.—National Carbide Corp., E. C. Ackerman, vice president, 60 East Forty-second street, New York, is starting work on calcium carbide plant near here on State road. Project is financed by Defense Plant Corp. Rust Engineering Corp., Clark building, Pittsburgh, is contractor. (Noted Aug. 10).

CANTON, O.—Union Metal Mfg. Co., 1432 Maple, will soon start construction of building which will add about 550 square feet of space.

CINCINNATI—Cincinnati Milling Machine Co. will construct a core-sand treating and reclaiming building, for which plans have been prepared by Rapp & Meacham, architects. Austin Co. has general contract.

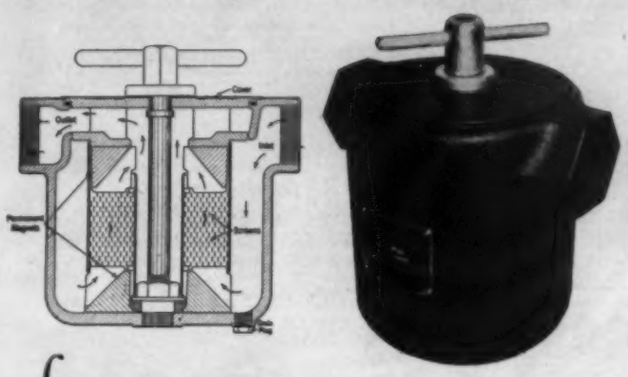
CLEVELAND—Frank Stockton Engineering Co., 11325 Union avenue, plans machine shop in building to be built for the firm and leased from a contractor.

CLEVELAND—Efficient Tool & Die Co., 9301 Elizabeth avenue, is going ahead with addition of 9600 square feet to shop at 9313 Nelson avenue. Frank Libuda is president.

CLEVELAND—Bissett Steel Co., George Bissett, president and treasurer, will soon start expansion of office and warehouse space. Demshar Builders Inc., 874 East 140th street, contractor.

CLEVELAND—Dracco Corp., successor to Dust Recovery & Collection Co., is adding

Good-by Fine Chips!



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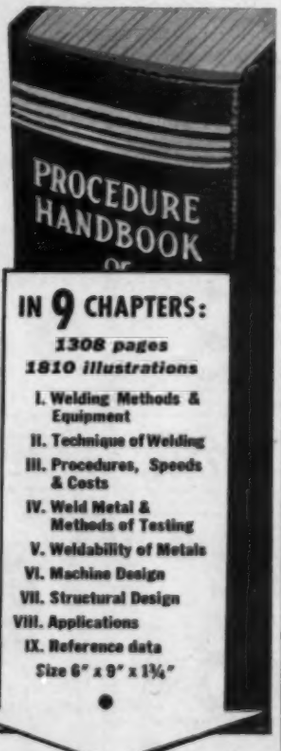

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to factory space with a $15,000 extension of building at 4063 East 116th street. George A. Gieseler is president.

NILES, O.—Niles Steel Products Co. has been authorized to erect a $35,000 addition to its factory. New furnaces will be installed.

TIFFIN, O.—Plant of Tiffin Art Metal Co., recently destroyed by fire, is being rebuilt. The plant produces steel bomb casings.

YOUNGSTOWN, O.—Dyson Metal Mfg. Co. will be chartered to manufacture various kinds of machinery, etc. Attorney Clyde Dyson, Mahoning Bank building, is agent.

CONNECTICUT

BRIDGEPORT, CONN.—Aluminum Co. of America, 2190 Post road, Fairfield, is completing plans for factory on Atlantic street here. C. G. MacFarquhar, 2190 Post road, Fairfield, engineer.

GLENBROOK, CONN.—Peabody Engineering Corp., 39 Maple avenue, plans addition on Maple avenue costing $40,000.

NEW YORK

BUFFALO—G.L.F. Mills Inc., Chamber of Commerce building, plans mill addition on Ganson street, costing over $40,000.

NEW JERSEY

EAST RUTHERFORD, N. J.—Becton Dickinson Co., Cornelia street, plans one-story manufacturing building addition. Estimated cost $40,000.

NEWARK, N. J.—M. W. Kellogg Co., foot of Danforth avenue, Jersey City, N. J., has let contract for one-story factory to Lawrence C. Roberts Inc., 1 East Forty-second street, New York. Estimated cost $40,000.

NEWARK, N. J.—Menner Packing Co., 25 Wall street, has awarded contract for one-story factory addition to P. Jantelle Co., 78 Stuyvesant avenue, Irvington, N. J. Fred G. Nobbe, 1630 Springfield avenue, Maplewood, N. J., architect.

PENNSYLVANIA

AMBRIDGE, PA.—National Supply Co., Grant building, Pittsburgh, has completed plans for improvements to manufacturing plant here. Hoffman & Crumpton, Century building, Pittsburgh, architects.

BRIDGEVILLE, PA.—Vanadium Corp. of America, Bridgeville, is completing plans for manufacturing plant facilities here to cost approximately $750,000. Rust Engineering Co., Clark building, Pittsburgh, general contractor.

CORRY, PA.—Rohim Mfg. Co. Inc. plans expenditure of $40,000 for plant. J. R. Dunniho, chief engineer.

ERIE, PA.—National Foundry Co., Erie, is completing plans for factory building at 1521 Raspberry street here to cost approximately $200,000. Sessinghaus & Ostergaard Inc., 1115 Peach street, Erie, general contractor. Meyers & Johnson, Commerce building, Erie, architects.

LANGELOTH, PA.—Climax Molybdenum Co., 500 Fifth avenue, New York, plans factory additions here, on which subcontracts have been awarded. Rust Engineering Co., Clark building, Pittsburgh, general contractor.

PHILADELPHIA—F. C. Castelli & Co., F. and Erie streets, will soon let contract for manufacturing building and office. Davis & Dunlap, 1717 Sansom street, architects.

MICHIGAN

DETROIT—Rotary Electric Steel Co., 21400 Mound road, will spend approximately $150,000 for plant addition. Giffels & Vallet, 1000 Marquette building, engineers.

DETROIT—Briggs Mfg. Co., Vernon highway has let contract for plant addition to W. E. Wood Co., 4549 Humboldt avenue. Estimated cost $100,000.

ILLINOIS

CHICAGO—Patch Foundry Inc., 815 West Van Buren street, has been incorporated to engage in general foundry and machine shop business, by H. L. Clink, J. J. Cuthbertson, and A. Loewenberg. Correspondent: Gurman & Eberle, 111 South LaSalle street.

CHICAGO—Mastercraft Machine Products Inc., 134 North LaSalle street, has been incorporated by C. Wuehrmann, H. Hirsch, and B. Lerman, to buy, sell and manufacture all kinds of products and machines. Correspondent: Samuel Wexler, 134 North La Salle street.

INDIANA

INDIANAPOLIS—Glidden Co., Berea road and Madison avenue, Cleveland, is remodeling former plant of American Hominy Co. here and also constructing soy bean oil process plant. Estimated cost $250,000.

MARYLAND

BALTIMORE—F. G. Schenuit Rubber Co., 3901-51 Clipper road will erect two-story addition. Kubitz & Koenig, engineers, Emerson Tower building.

BALTIMORE—United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, has contract at $40,000 for generator building at 1900 Chesapeake avenue; $18,000 for compressor and filling room, $10,000 for service building, and $7000 generator room

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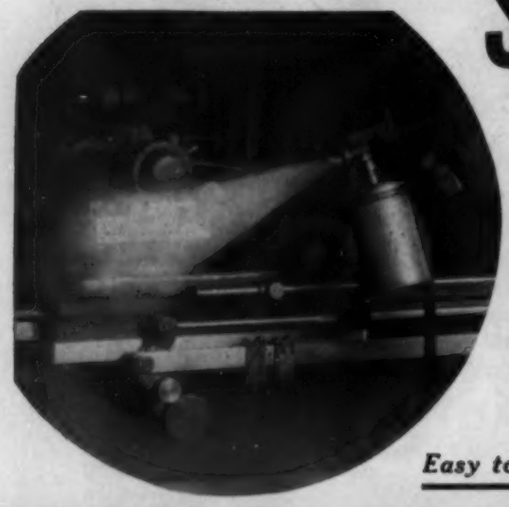

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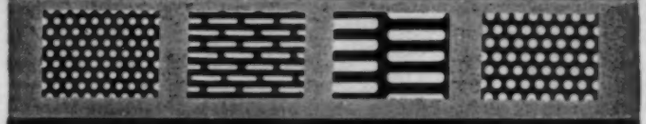

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TENNESSEE

MEMPHIS, TENN.—William Haughey, 208 West Georgia avenue, is altering manufacturing buildings. Cost estimated at $40,000.

ARKANSAS

GUION, ARK.—Silica Products Co. is rebuilding dry kiln and loading chute. Estimated cost $50,000.

WISCONSIN

DELAVAN, WIS.—Sta-Rite Products Inc. has awarded contract for plant addition, consisting of five bays to Steinar Haugen, Orfordville, Wis. Grassold & Johnson, 734 North Jefferson street, Milwaukee, architects.

MILWAUKEE—Defense Plant Corp. has authorized erection of tin shredding plant here to cost about $100,000. H. K. Ferguson Co., Cleveland, is contractor.

MILWAUKEE—Industrial company has let contract for six bays, unit C of factory, scrap and sand bins to Edward Steigerwald & Sons Inc., 5310 West State street, Milwaukee.

MILWAUKEE—International Harvester Co., 1714 West Bruce street, has let contract for plant to Gebhard-Berghammer Inc., 5420 West State street. A. J. Coon, care of owner, engineer.

TEXAS

HOUSTON, TEX.—Andy Ness Construction Co., 200 Portwood street, Houston, is low bidder for addition to plant at Bringhurst and Gillespie streets for Texas Electric Steel Casting Co.

CALIFORNIA

BURBANK, CALIF.—Pacific Airmotive Corp., 217 South First street, has let contract for addition to its plant.

LOS ANGELES—Baker Oil Tool Co. is erecting an addition to its plant at 2959 East Slauson avenue.

LOS ANGELES—Construction of a $1,500,000 detinning plant here has been authorized by Defense Plant Corp., to be operated by Los Angeles Tin Corp., a subsidiary of Los Angeles By-Products Corp. H. K. Ferguson Co., Cleveland, is contractor.

SAN DIEGO, CALIF.—Ryan Aeronautical Co. has awarded contract for assembly building and two-story office building, to cost $450,000. The company is also having plans prepared for sub-assembly building.

SAUSALITO, CALIF.—Marinship Corp. has plans for erection of machine shop addition.

CANADA

VANCOUVER, B. C.—Aqua Copper Co. Ltd., 736 Granville street, plans mining plant and auxiliary buildings near here to cost about $50,000.

COLLINGWOOD, ONT.—Collingwood Shipyards Ltd., J. S. Leitch, manager, has plans for plant addition and installation of equipment to cost about $120,000.

GALT, ONT.—Canadian General Rubber Co. Ltd., 52 Middleton street, has called bids for plant addition to cost about $40,000.

LONDON, ONT.—Dennisteel Corp. Ltd., 22 Dundas street, has plans and will call bids for plant addition here to cost about $25,000 with equipment.

NIAGARA FALLS, ONT.—Lionite Abrasives Ltd., Stamford, has plans and will call bids soon for plant addition here to cost about $10,000.

OAKVILLE, ONT.—Barringham Rubber Co. Ltd., Reynolds street north, will build plant to cost, with equipment, about $150,000. Plans call for installation of solvent recovery plant for recovery of keystone and plant for recovery of gasoline.

RENFREW, ONT.—Renfrew Machinery Co. Ltd. has given contract to M. J. Sulpher & Son, 150 Lisgar street, for plant addition estimated to cost about $10,000 with equipment.

HULL, QUE.—A. N. Sincennes, 131 St. Joseph boulevard, has plans and will let contracts soon for construction of plant addition to cost about $20,000.

MONTREAL, QUE.—Walls Chemical Canadian Corp. Ltd. will let contracts soon for plant addition at 340 St. Patrick street, Ville La Salle, to cost about $20,000 with equipment.

MONTREAL, QUE.—Canadian Power Boat Co. Ltd., 4000 St. Patrick street, L. D. Palmer, general manager, will let contracts immediately for plant addition to cost about $70,000 with equipment.

MONTREAL, QUE.—Montreal Dry Dock Co Ltd., 1151 Mill street, has begun preliminary work on plant addition estimated to cost $30,000 with equipment. Alphonse Gratton, Reg., 3440 Shuter street, has general contract.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Francois Jobin Inc., 88 St. Louis road, for addition to R.C.O.C. workshop at St. Malo, to cost about $70,000.

SHERBROOKE, QUE.—Superheater Co. Ltd., Drummond street, G. S. Thompson, manager, will start work immediately on plant addition here to cost about $12,000. Mold drying ovens will be installed.

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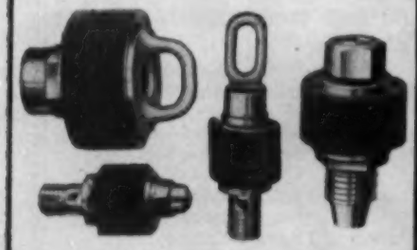

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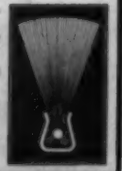

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TO THE MAN IN CHARGE OF MIRACLES

UNITROL is primarily a means of mounting skeleton starters. Here is shown the basic UNITROL mounting frame, which simplifies machine design and construction.

Here a skeleton starter is mounted in place in UNITROL frame. Has its own door, with or without front-operating pushbuttons, etc.

Built-in control—Through the simple expedient of UNITROL, a cavity cut in base of a machine, and four corner holding screws are all that's necessary.

You can do all sorts of things with UNITROL—for example, mounting 6 control elements in one frame, door pierced for front operation, the entire unit ready for easy installation.

Where a number of motors and controls must be accommodated, UNITROL builds up into a compact, space-saving, elastic and complete *section*—set beside the machine it serves.

Here's help in designing and building Motorized Machines

Despite the astounding production achieved by American Industry, more miracles are needed. Minutes gained here, space saved there, materials *not* used somewhere else, facilities and men freed for other purposes, when multiplied hundreds and thousands of times will bring the result we so sorely need.

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Why don't you investigate UNITROL further . . . *now?* Simply write for the completely descriptive brochure "UNITROL . . . The Next Step Forward in Motor Control." It's free. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.

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1892-1942 50th Anniversary

✓ DEC 16 1942

PRIORITIES ALLOCATIONS PRICES

SECTION TWO STEEL DECEMBER 14, 1942

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COMPLETE CMP INSTRUCTIONS

REVISED AS OF DECEMBER 8, 1942

This guide on WPB and OPA regulations has been compiled by the editors of STEEL as a handy reference and instruction book for the metalworking and metalproducing industries. Readers should consult regular issues of STEEL for changes and revisions which are reported each week.

STEEL
Penton Building
CLEVELAND, OHIO

Controlled Materials Plan of WPB

THE Controlled Materials Plan, eventual successor to the Production Requirements Plan for distribution of certain materials, gradually will become operative between now and July 1, 1943. First materials to be controlled are aluminum, copper and steel.

Under CMP, the War Production Board will adjust production of war and essential civilian goods to conform to material supplies. It will allot certain materials to different government agencies representing all military and essential civilian requirements.

The government agencies, known as "Claimant Agencies", consist of the Army, Navy, Maritime Commission, Aircraft Scheduling Unit, Office of Lend-Lease Administration, Board of Economic Warfare, and Office of Civilian Supply.

Claimant Agencies will subdivide their initial allotments among their prime contractors or other manufacturers of products for which they are responsible. The manufacturers receiving these allotments will, in turn, subdivide them among their subcontractors, and the latter will again subdivide among their suppliers, until all manufacturers have received their appropriate shares. These allotments represent permission for manufacturers to buy materials needed to fill authorized orders.

Claimant Agencies will receive their initial allotments from the Requirements Committee of WPB by Feb. 1, 1943. These will cover deliveries of materials to industry for the second quarter. During the first quarter industry will continue to operate under the Production Requirements Plan.

Allotments Given Preference

When CMP is fully in effect, producers of controlled materials will not be allowed to fill any orders except against allotments made under the Plan. Until July 1, the preference rating system will take care of those manufacturers who do not receive their allotments in time, but allotments for a given month will be filled ahead of other orders bearing only preference ratings. A preference rating accompanied by an allotment number will be higher than any other rating without an allotment number, except AAA.

Freference ratings will govern distribution of materials other than Controlled Materials and will settle conflicts which might occur in the production and delivery of manufactured items. Each company receiving an allotment number for allocation of controlled materials will also receive a preference rating for use in obtaining other materials.

Manufacturers of such items as tanks, ships, guns, aircraft, etc., which are generally contracted for by or through a Claimant Agency—and which are called "Class A" products—will receive their material allotment with an allotment number directly from the agency. Producers of a list of "Class B" products, such as generators, hardware, electrical appliances, bearings—parts frequently incorporated in other products— and civilian items generally, will receive their allotments from their WPB industry divisions, which in turn will receive allotments through the Office of Civilian Supply.

The "Class B" list is flexible and subject to revisioin. WPB should be consulted in event of question whether or not an item is a "Class B" product.

Directives Serve Warehouses

Warehouses handling controlled materials will not be given allotment numbers under CMP but will be supplied by WPB directives.

Claimant Agencies naturally must know how much material is required to make the various items for which they have contracted, in order to balance the allotments with available supplies. Such information is obtained from manufacturers through what are known as "Bills of Materials". These Bills cover requirements not only for controlled materials but also for other scarce materials and, in addition, indicate when the materials must be received to meet production schedules.

Each Claimant Agency will program the quantities of end-products—guns, planes, ships, railroad cars, etc.—most urgently needed for each quarter. Bills of Materials for each of these items will provide an estimate of total requirements to make these products and will permit the allotment of materials in the required amounts to meet authorized manufacturing schedules.

Bills of Materials must be furnished by manufacturers upon request. Detailed instructions for compiling them are shown in a succeeding article.

TIMETABLE OF CMP

Step 1 (Nov. 2, 1942)—CMP announced by War Production Board.

Step 2 (November and December)—Claimant Agencies complete collection of Bills of Materials and estimate requirements.

Step 3 (Jan. 1, 1943)—Claimant Agencies submit requirements to Controlled Materials Divisions, WPB, with a copy to Requirements Committee, showing controlled materials required, by months, broken down as between (a) production, (b) construction and facilities, and (c) maintenance, repair and operating supplies.

Step 4 (Jan. 1-15, 1943)—Controlled Materials Divisions and Office of Vice Chairman analyze requirements submitted by Claimant Agencies and make preliminary reconciliation to the extent possible between requirements and supply.

Step 5 (December, 1942, and January, 1943)—Claimant Agencies and prime consumers develop information necessary in making final allotments.

Step 6 (Feb. 1, 1943)—Requirements Committee makes allotment of controlled materials to Claimant Agencies for second quarter of 1943.

Step 7 (February, 1943)—Claimant Agencies distribute allotments to prime consumers.

Step 8 (February and early March)—Prime consumers divide allotments authorized by Claimant Agencies among secondary consumers, and consumers place authorized orders with suppliers.

Step 9 (March and thereafter)—Controlled Materials Divisions watch placement of orders on mills and mills' shipments and assist in placing orders for consumers of controlled materials who are unable to obtain mill acceptance of authorized orders.

Step 10 (July 1, 1943)—Alternative plans and procedures with reference to controlled materials are abolished and thereafter controlled materials are obtainable only under the CMP.

Its Function and Operation

THE recently announced Controlled Materials Plan has derived its name from the control which is applied to the three metals, steel, copper and aluminum, which are specifically allocated under its terms. It is believed that if production is controlled in terms of these three metals the distribution of other metals will be relatively simple. It may develop that some other materials will have to be brought under similar control. But of the materials widely used for production, steel, copper, and aluminum are believed, at the present time, to show the greatest shortage relative to demand.

Control of material, however, is really only one-half of the job undertaken by the new plan. The other, and perhaps more important half, might be called "Controlled Schedules." Schedules are to be limited to the material available as a condition of the allotment; thus schedules will be controlled not only on the basis of what is wanted, as heretofore, but also in terms of what can be realized from the raw materials available.

Double Control

The Controlled Materials Plan ties together the control of material and the control of schedules through the simple procedure of making raw material allotments through the same channels followed in setting the production schedules.

For example, the Army sets the production schedules for the prime contractors for tanks; under CMP the Army will also allot the material to the prime contractor of tanks, who in turn will reallot it to his subcontractors, also setting production schedules for his subcontractors. If it becomes necessary to cut the amount of material available for the production of tanks, the Army will reduce the production schedules of the prime contractor, and at the same time, reduce the amount of the material to be made available.

The prime contractor will go through the same steps with his subcontractor.

Definitions

(1) Controlled Material: Carbon Steel, Alloy Steel, Copper, Aluminum and such other materials as may be prescribed from time to time, in each case only in the forms and shapes indicated in the CMP Materials List, or as otherwise ordered by the Vice Chairman on Program Determination,

(2) CMP Materials: The materials on the list attached to copies of the plan. The list includes controlled materials and other materials for inclusion in bills of materials and inventory reports.

(3) Controlled Materials Division: The Division of the War Production Board which is charged with supervision over the production and distribution of any controlled material. References to decisions or actions of a Controlled Materials Division mean decisions or actions by the Director of the Division.

(4) Claimant Agency: War Department, Navy Department, Maritime Commission, Aircraft Scheduling Unit (Agent for Army Air Forces and the Navy Bureau of Aeronautics), Office of Lend-Lease Administration, Board of Economic Warfare, Office of Civilian Supply, and such others as may from time to time be designated by the order of the Program Vice Chairman.

(5) Requirements Committee: The Requirements Committee of the War Production Board, under the chairmanship of the WPB Program Vice Chairman, includes a representative of the State Department and a representative of each of the Claimant Agencies and passes upon the major divisions of materials for prosecution of the war. References to decisions or actions of the Committee mean decisions or actions by the Program Vice Chairman.

(6) Prime Consumer: Any person who receives an allotment of controlled material from a Claimant Agency either directly or through an office of such Agency. Prime consumers whose requirements are handled by the Office of Civilian Supply receive their allotments from WPB Industry Divisions.

(7) Secondary Consumer: Any person who receives an allotment of controlled material from a prime consumer or another secondary consumer.

(8) Class A Product: Any product containing any controlled material fabricated beyond the forms and shapes specified in the CMP Materials List, except a Class B product.

(9) Class B Product: Any product containing any controlled material fabricated beyond the forms and shapes specified in the CMP Materials List, which is contained in the Class B List of the Controlled Materials Plan.

WASHINGTON CONTROL

In addition to an understanding of the terms, another requisite to proper understanding of the new procedure is a mental picture of the Washington organization which is responsible for carrying out CMP. This Washington organization centers around the seven Claimant Agencies, who meet together in the Requirements Committee under the chairmanship of the Program Vice Chairman of the War Production Board. The Chairman of the Requirements Committee makes all decisions after examination of the requirements placed before him by the Claimant Agencies. These decisions are made in terms of total tonnages of controlled materials which are allotted to the Claimant Agencies for: (1) Production Program, (2) Construction, and (3) Maintenance, Repair and Operating Supplies.

In the case of all Claimant Agencies other than Civilian Supply, the allotments are then sub-allotted through their own internal channels to the prime consumers producing finished items under agreed upon production schedules. For example, the Navy receives an allotment of steel which it divides in such a manner as to obtain the maximum production from all shipyards under its jurisdiction. The Navy may vary the amounts allotted to destroyers, battleships and the like within its own discretion except as the Chairman of the Requirements Committee may make allotments earmarked for particular programs.

In the case of Civilian Supply, and indirect military requirements, the allotment is made to the Agency, but allotments are distributed through procedures administered by the Industry Divisions of the WPB. Thus, the Industry Divisions, which have a wide understanding of the problems of each industry, will continue to be the focal point for the distribution of material to almost all producers of other than specified items purchased directly by the Army, Navy and Maritime Commission.

Of major interest to the individual manufacturer, however, is not the overall plan of control or the Washington organization for administering that control, but just what he does to obtain delivery of the controlled—and other—materials.

Class A and Class B

The first question which must be answered by each manufacturer for himself is whether his product or products fall in Class A or Class B. Some manufacturers will produce both classes of products, but for purposes of clarity, the procedure for Class A and Class B products will be examined separately.

Class B is a specifically named list of classes of products. Class A is defined as all other products containing controlled materials. In general, however, Class A products may be thought of as those products purchased directly and manufactured specifically for the Claimant Agencies or for their prime contractors or subcontractors, such as tanks, ships, aircraft, tank engines, aircraft accessories and the like. Class B products may be thought of as generators, hardware, electrical appliances, bearings, consumers' goods, and other finished items of the regular civilian economy whether purchased for civilian or military purposes.

The basis on which a particular product is put in Class B by WPB is merely that it is more efficient to have the controlled materials for manufacture of the product allotted directly to the manufacturer by the Industry Division instead of having it come down through Claimant Agencies and other manufacturers.

If after determining the class into

which his products fall, a manufacturer believes they have been improperly designated, any manufacturer of class B products may apply to the Office of the Program Vice Chairman of WPB for permission to be treated as a maker of Class A products. Likewise, a manufacturer of Class A products making a large variety of items which are sold to many customers and whose allotments originate from several Claimant Agencies, may make similar application to be treated as a maker of Class B products.

Such permission will not be granted with reference to component parts or subassemblies, unless the necessary adjustments in Bills & Materials which include such component parts or subasemblies can be made without difficulty by the respective Claimant Agencies and consumers. With reference to Class A or Class B products which are not incorporated in other products, such permission will be granted where practical advantages are indicated.

After the manufacturer has determined the place of his products in the plan, the rest of the job divides itself into three major divisions: (1) the procedure for stating requirements; (2) method for obtaining the allotment; and (3) placing of purchase orders.

REQUIRMENTS

The requirements figures will be developed by the Claimant Agencies through the accumulation of Bills of Materials data for each class of finished product purchased by that agency. The compiling of these Bills of Materials will fall largely upon the prime consumers under the direction of the Claimant Agency. Detailed instructions will be issued by the several Claimant Agencies concerning the make-up of these Bills of Materials. (There are two kinds —Detail Bills of Materials and Summary Bills of Materials). In general, however, the Bills of Materials should indicate the gross and net weight (unless specifically exempted by the Claimant Agency) of each of the materials listed in the CMP Materials List, which are required for, and contained in, the complete procurement item. The exceptions to this rule will be (1) Government Furnished Equipment produced by other Prime Consumers; (2) Class B products as defined. Class B products are divided into "Group I" and "Group II."

In the case of Class B—Group I, products, the Bill of Materials should list by name and part number (if available) the quantity or dollar value of each of these items required in the complete procurement items, and should show the time interval required between receipt of Class B items as such and final acceptance or delivery of the procurement item. Class B, Group II products need not be included in the Bills of Materials of manufacturers who purchase them.

Class B: Requirements for Class B products will be compiled in two steps; (1) Each Claimant Agency will prepare its requirement estimates for Class B, Group I, products in number of units or in dollar value as may be agreed between the Agency and the Office of Civilian Supply and submit such requirements to the Office of Civilian Supply; (2) The Office of Civilian Supply, through the appropriate Industry Divisions, will compile bills of materials for determining the quantities of controlled materials needed to produce required volume of finished Blass B products, both Group I and Group II.

The Industry Divisions of WPB will gather this information from all industries. Specific instructions have been isued to make use of figures already in existence if they will meet the needs of the plan, in order to avoid imposing a completely new statistical burden on industry.

Maintenance and Repairs

Requirements for maintenance, repair and operating supplies for plants owned and operated by a Claimant Agency will be included in the requirements of that Agency and submitted to the Requirements Committee by the Agency. For example, a shipyard owned and operated by the Maritime Commission would receive its maintenance, repair and operating supply requirement through the Maritime Commission based on a statement of requirements made by that Agency to the Requirements Committee.

All other requirements for maintenance, repair and operating supplies, however, will be compiled in the same manner in which the requirements for Class B products are compiled—that is, through the appropriate Industry Divisions of the WPB for presentation to the Requirements Committee through the Office of Civilian Supply. In other words, the Industry Divisions of WPB will continue the work, which is already far advanced in many industries, of making up total maintenance, repair and operating supplies requirements for their industries.

OBTAINING ALLOTMENTS

Each Claimant Agency will submit its statement of requirements through the Controlled Materials Divisions for preliminary adjustment and reconciliation. The Requirements Committee will then examine the adjusted figures and the Chairman will make his decision as to the division of the supply of controlled materials not later than the last day of the first month of the quarter preceding the quarter in which the allotment is to be effective, e.g., January 31 for the second quarter. These allotments of controlled materials made to the Claimant Agencies will not exceed the supply as estimated by the Controlled Materials Divisions for each material.

On the basis of the allotments, each Claimant Agency will adjust its production programs to the amount of material available. At the same time applications for allotments will be received from prime consumers using controlled materials who sell Class A products to the Agency. Secondary consumers who make Class A products for sale to prime consumers or other secondary consumers will obtain their allotments from their customers. Products of Class B products will submit their applications to the proper Industry Divisions of WPB. The application forms are a simple statement of the monthly production schedule of end products and the monthly deliveries of the controlled materials required to fill that schedule.

Authorizes Production

Upon receipt of the applications from Class A producers, each Claimant Agency will authorize a monthly production schedule and allot specific amounts of material for each month to fill that schedule and return the authorization to the applicant. (In order to insure capacity production of Controlled Materials, the Claimant Agency will be allowed to make allotments to prime consumers up to 105 per cent of the allotments received from the Requirements Committee.)

In the case of Class B products, allotments of controlled materials will be made by the Industry Divisions in such a way as to insure the production of all the Class B products required by the Claimant Agencies unless a fabrication bottleneck prohibits the filling of all demands, in which case the requirements of the Agencies for the particular Class B product will be revised by the appropriate Agencies to fit fabrication capacity.

Each allotment will bear an Allotment Number. The Allotment Number is a coded number (W-1234-567-16) with a letter designating the Agency; four digits designating the Program (for total output of the item); three digits designating the schedule (for individual producer's output); and the final two digits designating the month in which the allotment applies. These months are numbered starting with January, 1942 as (01), April, 1943 as (16), January, 1944 as (25), and so on.

Ratings Assigned

In addition to the allotment number, a preference rating is assigned with the allotment. This preference rating is used to indicate the relative urgency in connection with the purchase of fabricated parts as discussed later, and in case of conflicts of schedules.

Upon receipt of an allotment, the prime consumer will immediately subdivide the allotment of controlled materials between himself and his immediate secondary consumers in such a way as to insure materials to meet the Authorized Production Schedule. The consumers will further subdivide their allotments between their own secondary consumers and so on down the line until the controlled materials have been authorized to all those producing Class A products contributing to the production schedule.

Recognizing the possibility of a delay in passing the allotment down the line step by step, an alternate procedure is offered in the plan for the subdivision of the allotment. Under the alternate procedure, the prime consumer will make up a complete list of all secondary consumers using controlled materials to make Class A products to be incorporated in his end products. Immediately upon receipt of his allotment, prime consumer will notify each secondary consumer of a tentatively authorized schedule and request each secondary consumer to submit at once a proposed statement of orders for controlled materials to carry

out the tentative schedule. After examination of the proposed orders and after making such modifications as may be necessary to fit the orders within the allotment, the prime consumer will notify all secondary consumers directly of the allotment and Allotment Number, instead of passing it down through intervening secondary consumers.

Allotment Number Required

It should be noted at this point, when the Plan is fully in effect (i.e. after June 30, 1943), no orders may be placed for controlled materials until an Allotment Number has been received, with certain minor exceptions, such as small orders from warehouses.

To facilitate the forward placing of orders, the Claimant Agencies are permitted to allot for quarters in advance of the quarter for which an allotment has been received. These forward commitments are limited to 80 per cent of the most recent quarterly allotment for the first succeeding quarter, 60 per cent for the second succeeding quarter, and 40 per cent for the third and subsequent quarters.

A Claimant Agency may allot any particular program 100 per cent of its requirements for the future quarters just so the total committed by the Agency are within the 80-60-40 ratio. For example, the Navy might approve allotments for 100 per cent of the carrier program for three quarters in advance if this did not mean a commitment in the third advance quarter of more than 40 per cent of the Navy's most recent quarterly allotment for all programs.

PLACING ORDERS

A consumer holding an Allotment Number is permitted to place his purchase order with any supplier except as may be otherwise specifically directed. In such case, the consumer will be notified that his order is to be placed with the particular supplier concerned. Provision is made, however, that orders must be placed in time to comply with necessary production cycles as determined by the Controlled Materials Divisions.

To avoid piling up of orders, a mill acting under a production directive — which specifies the quantities, forms and shapes of materials to be produced during a stated period of time—cannot accept orders totaling more than 110 per cent of such production directive. Mills or suppliers not acting under production directives are limited in accepting orders to 105 per cent of their expected production capacity.

Each supplier is required to notify the Controlled Materials Division concerned when these limits are reached. If, in spite of these provisions, a consumer holding an allotment number cannot find a supplier to fill his order, he should immediately notify the Controlled Materials Division concerned and arrangements will be made to find a supplier who can fill the order.

It is provided that all orders bearing allotment numbers are to be filled during the month designated if possible, and in no case may an order be postponed later than the last day of the following month. If a mill finds itself unable to fill its orders within the designated period, it must notify the Controlled Materials Division.

Form Accompanies Orders

In the case of steel, (except castings), when an order is placed directly with a mill, a form must accompany the purchase order, showing tonnages, month of shipment, and allotment number of steel products. The steel mill will indicate its acceptance or rejection of the order on this form and will send one copy of it to the Steel Division of WPB. Through this procedure, any maldistribution between the mills will be quickly caught and corrected. Also the Division will have an accurate basis for issuing production directives to the mills. Similar provisions may be called for in the case of copper and aluminum.

To assist the consumer of Controlled Material whose orders are based on numerous contracts bearing allotment numbers authorizing the purchase of small quantities of materials, provision is made for combining any number of such small numbers, providing the customer certifies that he can support the purchase order with allotment numbers and furnishes a statement showing how the allotments are divided between the Claimant Agencies. No such combination order shall include any item supported by a single allotment number applicable to more than the following quantities:

Carbon Steel	5 tons
Alloy Steel	1 ton
Stainless Steel	500 lbs.
Copper	200 lbs.
Aluminum	100 lbs.

It is expected that most small orders bearing allotment numbers will be placed with warehouses. Warehouses under CMP are given a definite status as part of the supply system and not as consumers of material. They will fill orders bearing Allotment Numbers within certain limits to be prescribed by the Controlled Materials Divisions. Arrangements will also be made for delivery from warehouse stocks of orders below certain tonnage which need not be accompanied by allotment numbers.

Other Materials

In placing orders for raw materials other than the Controlled Materials, the present procedure under preference ratings and other WPB Orders and Regulations will be followed.

After June 30, 1943, no preference ratings will have any effect on deliveries by producers of controlled materials. All orders for such deliveries must be accompanied by allotment numbers. Until then, orders bearing allotment numbers will take precedence over all rated orders but, to the extent that orders bearing allotment numbers do not take up the capacity of a mill, other orders may be filled according to preference ratings or applicable priorities regulations or orders.

In the case of fabricated products containing controlled materials, orders accompanied by allotment numbers will generally take precedence over all other orders, except those bearing a rating of AAA. Producers are not to accept orders bearing allotment numbers for fabricated products unless they can be filled on schedule. If fabricating bottlenecks develop, however, preference ratings will generally determine the sequence of delivery as between such orders, unless specific directions are issued to reconcile conflicting schedules. Preference ratings and priorities regulations or orders will also govern the sequence of deliveries as between orders which do not bear allotment numbers.

Detailed regulations regarding the relationship between a CMP and the preference rating system will be furnished before allotments are made under the Plan.

CONSTRUCTION:

Procedures to be followed in connection with the allotments for construction are similar to those followed for manufactured products. Each Claimant Agency will submit its requirements for construction of all facilities to be used exclusively for that Agency, and Civilian Supply will submit requirements for all construction not used exclusively for another Agency.

The allotments will be made through the Agency in the same manner as outlined above for manufactured products with the person responsible for the construction considered as the prime consumer and all other users of material in connection with the construction projects as secondary consumers.

INVENTORY CONTROL:

To control inventories, provision is made that each prime and secondary consumer of Controlled Materials whose inventory of CMP materials is in excess of such limits as may be specified will submit an inventory following the close of each quarter. These reports will be made available to the Controlled Materials Divisions and the Material Redistribution Division of the War Production Board, and steps will be taken to reduce the inventory of each consumer where an excess is indicated.

TRANSITION:

Speed is necessary in gathering together the facts so that the plan can gear the new war schedules to the material supplies position at the very earliest date. The current schedule calls for a statement of requirements from the Claimant Agencies to the Controlled Materials Branches by Jan. 1, 1943, and a decision from the Requirements Committee as to the second quarter allotments by Feb. 1. This will mean that the plan will be partially operative in the second quarter of 1943. However, provision is made for the transition by keeping in effect of all the present controls including PRP until the new plan is fully operative on July 1.

During the first quarter of 1943, CMP will have no effect on the PRP procedure. During the second quarter, however, some producers operating under PRP will have received allotments under CMP. Such manufacturers will proceed to extend their allotments in the manner provided by CMP, deducting the total from their total authorizations under the Production Requirements Plan.

Thus, if the manufacturer receives an authorization to purchase 1,000 tons of steel under PRP and has received CMP allotments for 400 tons, he will extend the CMP allotment number for 400 tons and place orders for the remaining 600 tons under the preference rating provided by his PD-25A certificate. In all cases, the orders placed under an allotment number will take precedence over orders placed under the preference rating indicated by PRP.

How to Prepare Bills of Materials

AT the request of the appropriate Claimant Agency, prime consumers shall prepare and submit to such agency Summary Bills of Materials and, if specifically requested, Detail Bills of Materials, for procurement items as specified, in the form hereinafter described. The responsibility for compiling a complete Bill of Materials for a procurement item including all sub-contracted parts, is vested in the prime consumer.

In the case of purchased parts or assemblies it will be necessary for the consumer to secure from his secondary consumer the necessary information to complete the Bill of Materials and to furnish him with a copy of these instructions, in order to preserve uniformity in the preparation of all Bills of Materials.

DEFINITIONS

1. Detail Bill of Materials.—A list of all component parts of a procurement item showing material requirements.

2. Summary Bill of Materials.—A list of the material requirements for a complete procurement item or a recapitulation of the Detail Bill of Materials. In some instances the Claimant Agency involved may request that this Summary Bill be subdivided into functional groups, for scheduling purposes. In each case spare parts sets must be shown separately and sub-totaled on the Bill of Materials.

3. Prototype Bill of Materials.—A Bill of Materials that is applicable to several styles or models of the same basic part or assembly, varying slightly in minor details which have little or no effect on the aggregate material content.

4. Procurement Item.—The complete assembly or product to be furnished by a Prime Consumer including extra parts, such as spare wheels and tires on trucks, and auxiliary or accessory equipment, such as picks, shovels, fire extinguishers, tool kits, etc., on tanks, which are normally attached to or shipped as a constituent part of the procurement item; and spare parts sets specified to be shipped concurrently with the basic procurement item.

5. CMP Materials List.—This is a classification list of materials, designed for the preparation of Summary Bills of Materials under the Controlled Materials Plan. These materials have been assigned code numbers for convenience in accumulating the data requested herein, and a conversion table showing the translation from "Red Book" codes to C. M. P. codes is included.

6. CMP Materials Code Number.—The number taken from the CMP Materials List, used for convenience in accumulating the data requested herein.

7. Drawing or Part Number.—The number normally used to identify the individual part or assembly, and for use in connection with the preparation of Detail Bills of Materials. If the official government part numbers are available, these should be used.

8. Part Name.—The name of an individual part or an individual assembly, such as rope, buckle, piston, firing pin, etc., to be shown only on Detail Bills of Materials.

9. Specification or Chemical Analysis of Material.—This refers to standard specifications such as "S. A. E.", "Army", and "Navy", "Federal", "A. S. T. M.". In the absence of such recognized specifications, a manufacturer's specifications may be used, but only if an analysis showing chemical composition is furnished.

10. Net Weight.—The weight of a material actually contained in a finished part (in the case of a Detail Bill of Materials) or in a completed procurement item (in the case of a Summary Bill of Materials).

11. Gross Weight (including rejections, etc.).—The weight of the material in the form shipped by the material producer and required for the manufacture of the procurement item or one of its parts. This should include reasonable allowances based on experience for processing losses, rejections, culls, testing, and spoilage, in such manner as may be prescribed by the Vice Chairman. For special definitions covering individual materials consult the CMP materials list.

12. Number of Parts (shown on Detail Bill of Materials only).—Number of finished parts (of the particular part being reported) to be incorporated in the functional group or its sub-division of the procurement item being reported. Taking, for example, a piston ring as the part being reported for a six cylinder motor having two rings for each piston,—the Number of Parts would be 12 if the motor were the functional group under consideration.

13. Total Net Weight

a. Detail Bill of Materials.—On the Detail Bill of Materials, Total Net Weight is the Net Weight Per Part multiplied by the Number of Parts. It is the aggregate Net Weight of all parts identical with the one being reported which will be incorporated in the particular subdivision of the procurement item as listed. In the case of the piston rings mentioned above, it is the total net weight of the 12 piston rings.

b. Summary Bill of Materials.—On the Summary Bill of Materials the Total Net Weight is the total net weight of a particular material contained in the complete procurement item, unless the Summary Bill is subdivided by functional or other groups, at the specific request of the Claimant Agency involved; then it will be the total weight contained in the sub-division of the procurement item as listed.

14. Total Gross Weight (Including Rejections, Etc.).

a. Detail Bill of Materials—On the Detail Bill of Materials, Total Gross Weight is the Gross Weight Per Part multiplied by the Number of Parts. In the case of the piston rings referred to above, it would be the total weight of the particular material needed to produce the 12 rings including allowances as indicated in the definition of "Gross Weight."

b. Summary Bill of Materials—On the Summary Bill of Materials, the total gross weight (as defined) is the total of a particular material required to make all parts of the procurement item, except class B products. However, if the Summary Bill of Materials is sub-divided by functional or other groups, at the specific request of the Claimant Agency involved, it will be the total weight of the material needed to make all the parts in such a sub-division.

15. Lead Time (Manufacturing or flow time)—Lead time is the time interval expressed in months between the required delivery of materials from the plant of the supplier of the listed materials and final acceptance or delivery of the procurement item, or in the case of Class B products as defined, upon completion of their manufacture. **This lead time shall be based on the assumption that required materials will be available for delivery when needed.**

As a special example, the lead time for bar stock from which a steel forging is made would be the total elapsed time from the delivery of the bar stock from the steel mill to the time of acceptance by the agencies of the item of procurement in which the finished forging is incorporated. This time will include all intermediate transportation and processing time such as time for forging, heat treating, machining, assembly into the final product and testing.

NOTE—It is recommended that in those cases where questions arise as to the foregoing definitions or with respect to the procedure outlined below, the prime consumer immediately refer the matter for decision to the appropriate Claimant Agency requesting the information in order that no delay or unnecessary effort be involved in this work.

GENERAL INSTRUCTIONS

1. All Bills of Materials should include materials required for those parts manufactured by the Prime Consumer and for those items purchased from Secondary Consumers, with the exception of Government Furnished Equipment (GFE) produced by other Prime Consumers and products on the complete Class B list. The Class B list is divided into two parts: those products which must be listed on Bills of Materials (Group I) and those products which do not have to be listed on any Bills of Materials (Group II). Further details regarding the Class B products are contained in the description appearing at the head of the list.

In the case of those products which are to be listed (Class B—Group I and GFE), the Bill of Materials is to show by name and part number (if available) the quantity (in the terms specified on the B list) of each of these items required in the complete procurement

item, and is to show the time interval required between the receipt of listed products (including GFE items) as such and final acceptance or delivery of the procurement item.

2. It is imperative that a Summary Bill of Materials covering the materials on the CMP Materials List be submitted by the Consumer, and Detail Bills of Materials may also be required by the Claimant Agency involved. Regardless of whether or not the Detail Bill of Materials is requested, the Consumer will find the Detail Bill of Materials form useful as a work sheet in accumulating the data to be furnished in the Summary Bill of Materials.

3. The presentation of a Summary Bill of Materials to the Claimant Agency involved should not be delayed awaiting the preparation of the Detail Bill of Materials in its final form. The submission of the Detail Bill of Materials may be deferred until a later date if such delay is anticipated. The presentation of a summary bill of materials covering all the materials or the CMP list must not delay the submission of information covering the controlled materials.

4. All Bills of Materials should indicate the gross weight, and, unless specifically exempted by the Claimant Agency, the net weight of each of the materials listed which are required for and contained in the complete procurement item. The presentation of Summary Bills of Materials should not be delayed awaiting the accumulation of net weight information. The submission of such net weight data may be deferred until a later date.

5. All materials in Summary Bills of Materials are to be reported in terms of the unit of measure indicated on the attached CMP Materials List. Particular care should be taken to indicate clearly the decimal position in reporting these weights.

Only Direct Requirements

6. The Bill of Materials is to include only direct material requirements; that is, materials incorporated in the finished product (for quantities, see definitions of net and gross weight), including, for example, material deposited in plating and material in packaging when specified as an integral part of an item of procurement. Materials indirectly used in the manufacturing process should be omitted, such as grinding wheels, lubricants, coolants, and operating and testing supplies.

7. In covering small purchased assemblies, which in the aggregate consume small quantitites of the listed materials, it will be satisfactory to accept from the secondary consumer supplying such assemblies, a prototype Bill of Materials. This must be noted on the Bill of Materials.

8. At the request of the Claimant Agency, the Prime Consumer will indicate for the materials listed in his Summary Bill of Materials, approximate lead times as defined. If the manufacturing period is relatively short, a single lead time may be sufficient. Where the manufacturing time is relatively long and where deliveries of materials are required at varying time intervals, this should be indicated. In such cases, the quantity required at each time interval should be listed separately on the Summary Bill of Materials and the lead time listed in the appropriate column.

9. It will be necessary for the consumers to determine the metal content of those materials marked with an asterisk (*) on the CMP Materials List in certain alloys. To do this, the specification or chemical analysis of the material in its commercial form must be ascertained. This will indicate the percentage of the total weight of the CMP Material represented in the alloy. Such percentages, multiplied by the gross and net weight, as defined, of the alloy will develop the gross and net weight of the alloying metal required. For example, if 100 pounds of Nickel Silver Castings are required for the production of a given item, and its specification contains 22 per cent Nickel and 26 per cent Zinc, the Nickel and Zinc gross weight requirements will be reported as 22 pounds and 26 pounds, respectively, for that item, in addition to other materials.

It will be also required to determine the Cadmium, Nickel, and Zinc content of plated products. Where possible, determine the weight by dividing the weight of anodes and metallic salts consumed by the number of pieces produced. Where this information is not available, estimates can be made by the surface area method.

10. In order to eliminate, so far as practicable, all unnecessary work, those consumers who have already furnished Bills of Materials of one type or another, should consult the Claimant Agency involved, to ascertain whether such data are in sufficient detail to meet the requirements of these instructions. In all cases where a Prime Consumer wishes to submit his Bill of Materials on a form other than that included with these instructions, permission must be obtained from the Agency requesting the Bill of Materials to use such a form.

11. In order to obtain complete and accurate information, it is desirable to have a definite group assigned to prepare Bills of Materials information. This group should contain individuals familiar with engineering specifications and with production materials and methods. However, the exact method used by a Prime Consumer to produce Bills of Materials is his own responsibility, providing the information compiled is as requested.

12. The Prime Consumer must maintain Bills of Materials on all procurement items on a current basis at all times by submitting revisions indicating the effect of all engineering or specification changes which substantially alter the total quantity of any material required during a month.

Detail Bill of Materials

a. The Detail Bill of Materials (illustrative form attached) should be prepared from the engineering parts list and should show an analysis by materials of each component part (excluding GFE and Class B products) of the procurement item under the following headings:

(1) Drawing or part number.
(2) Part Name.
(3) Name of material.
(4) Material Code number (only to be furnished when specifically requested).
(5) Specification or chemical analysis of the material (only to be furnished when specifically requested).
(6) Size of material (only to be furnished when specifically requested).
(7) Net weight of finished part.
(8) Gross weight (including rejections, etc.).
(9) Number of parts.
(10) Total net weight.
(11) Total gross weight (including rejections, etc.).

b. Parts in the Detail Bill of Materials should be arranged in functional groups. In general these groupings should be determined by the Prime Consumer in accordance with his own company or industry practice and should be modified only to the degree necessary for adequate scheduling by the Claimant Agencies. It is required that extra parts, spare part sets, and accessory equipment shipped concurrently be separated from the basic unit of procurement.

c. When reporting small purchased assemblies excluding Class B products, which are not generally separated into individual parts by the purchaser, the analysis, unless specified by the Claimant Agency involved, may be made for the entire assembly without detail as to each individual part, except for individual pieces or subassemblies which may be furnished in spare part sets. Components of such purchased assemblies should be listed in a group immediately following the name and part number of the assembly in order that they may be identified readily as parts of such assembly.

d. It may be necessary in some cases to make an engineering estimate of material requirements for small items which require negligible amounts of material by grouping them and omitting detail. In each instance where this procedure is used, a notation on the Bill of Materials should indicate the manner in which such material estimates were calculated.

e. The Detail Bill of Materials shall contain separate lists of Class B items and GFE items incorporated in the Procurement item, as explained in General Instructions number one.

Summary Bill of Materials

a. The Summary Bill of Materials (illustrative form attached) shall show total amounts of each material shown on the CMP Materials List required for a procurement item excluding class B products and GFE as follows:

(1) CMP Materials List name.
(2) CMP Material Code number.
(3) Total net weight.
(4) Total gross weight (including rejections, etc.).
(5) Lead Time or Lead Times.

b. Any further analysis by functional or other grouping need be made only at the specific request of the Claimant Agency requesting the Bill of Materials, and should be considered as a limited and non-recurring special study.

c. The Summary Bill of Materials shall contain a separate list of Class B items incorporated in the procurement item being reported, as explained in General Instructions number one.

(Illustrative Sample)

DETAIL BILL OF MATERIALS FOR CONTROLLED MATERIALS PLAN

CMP-2
11-14-42

Form Approved
Budget Bureau No. 12-R468-42

PROCUREMENT ITEM (Gun) ..... REPORTING CONSUMER (Victory Corp.)
TYPE (3 inch) ..... ADDRESS Detroit, Mich.
MODEL (M6) .....
Material for (100) procurement items

Line	Drawing or Part No.	Part Name	Material Name	Material Code No.	Specification or Chem. Anal. of Material	Size of Material	Weight (lbs.) Net	Weight (lbs.) Gross	No. of Parts	Total Weight (lbs.) Net	Total Weight (lbs.) Gross
1	D1700	Tube	Alloy Steel centrifugal casting		3% Chromium, 0.15% molybdenum, 1.5% manganese, Remainder C. P. S. & Fe.		825.0	2500.00	100	82,500	250,000
2	D1792	Breech block	Alloy Steel, bar, hot rolled		SAE 3000	6" x 6½"	125.00	150.00	100	12,500	15,000
3 etc.	C3765	Fixed ring	Bronze casting		QQ-B-700 (Fed. Spec.)		48	60	100	4,800	6,000
	Spares										
1	D1700	Tube	Alloy Steel, etc. (see above)		3% Chromium, etc. (see above)		825.0	2500.00	10	8,250	25,000
2	D1792	Breech block	Alloy Steel, bar, hot rolled		SAE 3000	6" x 6½"	125.00	150.00	10	1,250	1,500
3	C3765	Fixed ring	Bronze casting		QQ-B-700 (Fed. Spec.)		48	60	20	980	1,200

Signature of authorized official (John Doe) Date (11/9/42)

Sheet No. (1) of (4) Sheets

Illustrative Sample

SUMMARY BILL OF MATERIALS FOR CONTROLLED MATERIALS PLAN

CMP-1
11-14-42

Form Approved
Budget Bureau No. 12-R-467-42

PROCUREMENT ITEM (Tank) ..... REPORTING CONSUMER (Victory Corp.) .....
TYPE (Light) .....
MODEL (M 4) ..... ADDRESS (Detroit, Michigan) .....
Material for (1) procurement item

Line No.	MATERIAL (See CMP Materials List)	CMP Material Code No.	Total Weight (lbs.) Net	Total Weight (lbs.) Gross Incl. Rejections, Etc.	Lead Time (No. of mos.)
1	Aluminum Extruded Shape, 28 Alloy	4301	110.0	121.2	4
2	Magnesium Die Casting	5301	18.0	22.0	2
3	Steel, Bar, Hot Rolled	2005	25.0	30.0	4
4	....do....	2005	20.0	30.0	3
5 etc.	Beryllium	5615	1.1	1.5	3
	Spare parts				
41	Steel, Bar, Hot Rolled	2005	5.0	7.0	3
46 etc.	Cadmium	5715	0.8	1.0	3

Signature of authorized official (John Doe) Date (11/9/42)

Sheet No. (1) of (4) Sheets

CLASS B PRODUCTS LIST

This list is intended to include certain specified types of intermediate products or component parts which may be included in either Class A or other Class B products and, in addition, certain specified classes of civilian-type end products. Manufacturers of any Class A or Class B product will exclude from their calculations of bills of materials the amounts of material contained in any of the items appearing on the Class B product list.

Manufacturers of Class A or Class B products requiring items which appear on the "Class B—Group I List" shall report their requirements for such products in units, dollars, etc., as is specified in the list. Secondary consumers shall report their requirements to prime consumers and prime consumers shall accumulate their own requirements and the requirements of their secondary consumers and forward a summary of such total requirements to the Claimant Agency. The Claimant Agencies shall report their total requirements for each of the Class B—Group I product categories to the War Production Board.

Manufacturers of Class A or Class B products requiring items which appear on the "Class B—Group II List" shall not report their requirements for such items. Requirements of manufacturers of Class A and Class B products for items appearing on the "Class B—Group II List" will be estimated by the War Production Board in co-operation with the Claimant Agencies.

CLASS B—GROUP I LIST

Classification

Batteries—(° Dollars)
- Dry-cell Batteries, Storage Batteries

Bearings, Ball and Roller—(° Units)
- Ball Bearings (Aircraft)
  - Rod End, Bell Crank, Rocker Arm
- Ball Bearings (Annular, Thrust, Self-Aligning)
  - Below 30 MM O. D.
  - 31 MM O. D. thru 52 MM O. D.
  - 53 MM O. D. thru 100 MM O. D.
  - 101 MM O. D. thru 240 MM O. D.
  - Above 240 MM O. D.
- Cylindrical Roller Bearings (including Thrust Type)
  - Below 2" O. D.
  - 2" O. D. to 4" O. D.
  - 4" O. D. to 6" O. D.
  - 6" O. D. to 8" O. D.
  - 8" O. D. to 10" O. D.
  - Above 10" O. D.
- Cylindrical Needle Roller Bearings
  - Below 2" O. D.
  - 2" O. D. to 4" O. D.
  - 4" O. D. to 6" O. D.
  - 6" O. D. to 8" O. D.
  - Above 8" O. D.
- Self-Aligning Annular Contact Roller Bearings
  - Below 2" O. D.
  - 2" O. D. to 4" O. D.
  - 4" O. D. to 6" O. D.
  - Above 6" O. D.
- Tapered Roller Bearings (including Thrust Type)
  - Below 2" O. D.
  - 2" O. D. to 4" O. D.
  - 6" O. D. to 8" O. D.
  - 8" O. D. to 10" O. D.
  - 10" O. D. to 30" O. D.
  - Above 30" O. D.
- Steel Balls
  - Below ¼" O. D.
  - ¼" O. D. to ½" O. D.
  - ½" O. D. to ¾" O. D.
  - ¾" O. D. to 1" O. D.
  - 1" O. D. to 1½" O. D.
  - 1½" O. D. to 2" O. D.
  - Above 2" O. D.

(O. D.—Outside Diameter)

Blowers and Fans: Blast, Blower Type, Exhaust Drying, Forced Draft, and Industrial (excluding Turbo-blowers)—(° Dollars and units)
- Shipboard Ventilating
  - Axial, Centrifugal, Propeller: Exhaust, Circulating
- Shipboard Mechanical Draft
  - Axial, Centrifugal: Induced Draft, Forced Draft
- Land Process and Ventilating
  - Axial, Propeller: Exhaust, Circulating
  - Centrifugal: Standard Duty, High Temperature, Heavy Duty
- Land Mechanical Draft

° Unit of reporting.

item, and is to show the time interval required between the receipt of listed products (including GFE items) as such and final acceptance or delivery of the procurement item.

2. It is imperative that a Summary Bill of Materials covering the materials on the CMP Materials List be submitted by the Consumer, and Detail Bills of Materials may also be required by the Claimant Agency involved. Regardless of whether or not the Detail Bill of Materials is requested, the Consumer will find the Detail Bill of Materials form useful as a work sheet in accumulating the data to be furnished in the Summary Bill of Materials.

3. The presentation of a Summary Bill of Materials to the Claimant Agency involved should not be delayed awaiting the preparation of the Detail Bill of Materials in its final form. The submission of the Detail Bill of Materials may be deferred until a later date if such delay is anticipated. The presentation of a summary bill of materials covering all the materials or the CMP list must not delay the submission of information covering the controlled materials.

4. All Bills of Materials should indicate the gross weight, and, unless specifically exempted by the Claimant Agency, the net weight of each of the materials listed which are required for and contained in the complete procurement item. The presentation of Summary Bills of Materials should not be delayed awaiting the accumulation of net weight information. The submission of such net weight data may be deferred until a later date.

5. All materials in Summary Bills of Materials are to be reported in terms of the unit of measure indicated on the attached CMP Materials List. Particular care should be taken to indicate clearly the decimal position in reporting these weights.

Only Direct Requirements

6. The Bill of Materials is to include only direct material requirements; that is, materials incorporated in the finished product (for quantities, see definitions of net and gross weight), including, for example, material deposited in plating and material in packaging when specified as an integral part of an item of procurement. Materials indirectly used in the manufacturing process should be omitted, such as grinding wheels, lubricants, coolants, and operating and testing supplies.

7. In covering small purchased assemblies, which in the aggregate consume small quantitites of the listed materials, it will be satisfactory to accept from the secondary consumer supplying such assemblies, a prototype Bill of Materials. This must be noted on the Bill of Materials.

8. At the request of the Claimant Agency, the Prime Consumer will indicate for the materials listed in his Summary Bill of Materials, approximate lead times as defined. If the manufacturing period is relatively short, a single lead time may be sufficient. Where the manufacturing time is relatively long and where deliveries of materials are required at varying time intervals, this should be indicated. In such cases, the quantity required at each time interval should be listed separately on the Summary Bill of Materials and the lead time listed in the appropriate column.

9. It will be necessary for the consumers to determine the metal content of those materials marked with an asterisk (*) on the CMP Materials List in certain alloys. To do this, the specification or chemical analysis of the material in its commercial form must be ascertained. This will indicate the percentage of the total weight of the CMP Material represented in the alloy. Such percentages, multiplied by the gross and net weight, as defined, of the alloy will develop the gross and net weight of the alloying metal required. For example, if 100 pounds of Nickel Silver Castings are required for the production of a given item, and its specification contains 22 per cent Nickel and 26 per cent Zinc, the Nickel and Zinc gross weight requirements will be reported as 22 pounds and 26 pounds, respectively, for that item, in addition to other materials.

It will be also required to determine the Cadmium, Nickel, and Zinc content of plated products. Where possible, determine the weight by dividing the weight of anodes and metallic salts consumed by the number of pieces produced. Where this information is not available, estimates can be made by the surface area method.

10. In order to eliminate, so far as practicable, all unnecessary work, those consumers who have already furnished Bills of Materials of one type or another, should consult the Claimant Agency involved, to ascertain whether such data are in sufficient detail to meet the requirements of these instructions. In all cases where a Prime Consumer wishes to submit his Bill of Materials on a form other than that included with these instructions, permission must be obtained from the Agency requesting the Bill of Materials to use such a form.

11. In order to obtain complete and accurate information, it is desirable to have a definite group assigned to prepare Bills of Materials information. This group should contain individuals familiar with engineering specifications and with production materials and methods. However, the exact method used by a Prime Consumer to produce Bills of Materials is his own responsibility, providing the information compiled is as requested.

12. The Prime Consumer must maintain Bills of Materials on all procurement items on a current basis at all times by submitting revisions indicating the effect of all engineering or specification changes which substantially alter the total quantity of any material required during a month.

Detail Bill of Materials

a. The Detail Bill of Materials (illustrative form attached) should be prepared from the engineering parts list and should show an analysis by materials of each component part (excluding GFE and Class B products) of the procurement item under the following headings:

(1) Drawing or part number.
(2) Part Name.
(3) Name of material.
(4) Material Code number (only to be furnished when specifically requested).
(5) Specification or chemical analysis of the material (only to be furnished when specifically requested).
(6) Size of material (only to be furnished when specifically requested).
(7) Net weight of finished part.
(8) Gross weight (including rejections, etc.).
(9) Number of parts.
(10) Total net weight.
(11) Total gross weight (including rejections, etc.).

b. Parts in the Detail Bill of Materials should be arranged in functional groups. In general these groupings should be determined by the Prime Consumer in accordance with his own company or industry practice and should be modified only to the degree necessary for adequate scheduling by the Claimant Agencies. It is required that extra parts, spare part sets, and accessory equipment shipped concurrently be separated from the basic unit of procurement.

c. When reporting small purchased assemblies excluding Class B products, which are not generally separated into individual parts by the purchaser, the analysis, unless specified by the Claimant Agency involved, may be made for the entire assembly without detail as to each individual part, except for individual pieces or subassemblies which may be furnished in spare part sets. Components of such purchased assemblies should be listed in a group immediately following the name and part number of the assembly in order that they may be identified readily as parts of such assembly.

d. It may be necessary in some cases to make an engineering estimate of material requirements for small items which require negligible amounts of material by grouping them and omitting detail. In each instance where this procedure is used, a notation on the Bill of Materials should indicate the manner in which such material estimates were calculated.

e. The Detail Bill of Materials shall contain separate lists of Class B items and GFE items incorporated in the Procurement item, as explained in General Instructions number one.

Summary Bill of Materials

a. The Summary Bill of Materials (illustrative form attached) shall show total amounts of each material shown on the CMP Materials List required for a procurement item excluding class B products and GFE as follows:

(1) CMP Materials List name.
(2) CMP Material Code number.
(3) Total net weight.
(4) Total gross weight (including rejections, etc.).
(5) Lead Time or Lead Times.

b. Any further analysis by functional or other grouping need be made only at the specific request of the Claimant Agency requesting the Bill of Materials, and should be considered as a limited and non-recurring special study.

c. The Summary Bill of Materials shall contain a separate list of Class B items incorporated in the procurement item being reported, as explained in General Instructions number one.

(Illustrative Sample)

DETAIL BILL OF MATERIALS FOR CONTROLLED MATERIALS PLAN

CMP-2
11-14-42

Form Approved
Budget Bureau No. 12-R468-42

PROCUREMENT ITEM (Gun) ..... REPORTING CONSUMER (Victory Corp.)
TYPE (3 inch) ..... ADDRESS Detroit, Mich.
MODEL (M6) .....
Material for (100) procurement items

Line	Drawing or Part No.	Part Name	Material Name	Material Code No.	Specification or Chem. Anal. of Material	Size of Material	Weight (lbs.) Net	Weight (lbs.) Gross	No. of Parts	Total Weight (lbs.) Net	Total Weight (lbs.) Gross
1	D1700	Tube	Alloy Steel centrifugal casting		3% Chromium, 0.15% molybdenum, 1.5% manganese, Remainder C. P. S. & Fe.		825.0	2500.00	100	82,500	250,000
2	D1792	Breech block	Alloy Steel, bar, hot rolled		SAE 3000	6" x 6½"	125.00	150.00	100	12,500	15,000
3 etc.	C3765	Fixed ring	Bronze casting		QQ-B-700 (Fed. Spec.)		48	60	100	4,800	6,000
	Spares										
1	D1700	Tube	Alloy Steel, etc. (see above)		3% Chromium, etc. (see above)		825.0	2500.00	10	8,250	25,000
2	D1792	Breech block	Alloy Steel, bar, hot rolled		SAE 3000	6" x 6½"	125.00	150.00	10	1,250	1,500
3	C3765	Fixed ring	Bronze casting		QQ-B-700 (Fed. Spec.)		48	60	20	960	1,200

Signature of authorized official (John Doe) Date (11/9/42)

Sheet No. (1) of (4) Sheets

Illustrative Sample

SUMMARY BILL OF MATERIALS FOR CONTROLLED MATERIALS PLAN

CMP-1
11-14-42

Form Approved
Budget Bureau No. 12-R-467-42

PROCUREMENT ITEM (Tank) ..... REPORTING CONSUMER (Victory Corp.) .....
TYPE (Light) ..... ADDRESS (Detroit, Michigan) .....
MODEL (M 4) .....
Material for (1) procurement item

Line No.	MATERIAL (See CMP Materials List)	CMP Material Code No.	Total Weight (lbs.) Net	Total Weight (lbs.) Gross Incl. Rejections, Etc.	Lead Time (No. of mos.)
1	Aluminum Extruded Shape, 28 Alloy	4301	110.0	121.2	4
2	Magnesium Die Casting	5301	18.0	22.0	2
3	Steel, Bar, Hot Rolled	2005	35.0	50.0	4
4	....do....	2005	20.0	30.0	3
5 etc.	Beryllium	5615	1.1	1.5	3
	Spare parts				
41	Steel, Bar, Hot Rolled	2005	5.0	7.0	3
46 etc.	Cadmium	5715	0.8	1.0	3

Signature of authorized official (John Doe) Date (11/9/42)

Sheet No. (1) of (4) Sheets

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CLASS B—GROUP I LIST

Classification

Batteries—(* Dollars)
Dry-cell Batteries, Storage Batteries

Bearings, Ball and Roller—(* Units)
Ball Bearings (Aircraft)
Rod End, Bell Crank, Rocker Arm
Ball Bearings (Annular, Thrust, Self-Aligning)
Below 30 MM O. D.
31 MM O. D. thru 52 MM O. D.
53 MM O. D. thru 100 MM O. D.
101 MM O. D. thru 240 MM O. D.
Above 240 MM O. D.
Cylindrical Roller Bearings (including Thrust Type)
Below 2" O. D.
2" O. D. to 4" O. D.
4" O. D. to 6" O. D.
6" O. D. to 8" O. D.
8" O. D. to 10" O. D.
Above 10" O. D.
Cylindrical Needle Roller Bearings
Below 2" O. D.
2" O. D. to 4" O. D.
4" O. D. to 6" O. D.
6" O. D. to 8" O. D.
Above 8" O. D.
Self-Aligning Annular Contact Roller Bearings
Below 2" O. D.
2" O. D. to 4" O. D.
4" O. D. to 6" O. D.
Above 6" O. D.
Tapered Roller Bearings (including Thrust Type)
Below 2" O. D.
2" O. D. to 4" O. D.
6" O. D. to 8" O. D.
8" O. D. to 10" O. D.
10" O. D. to 30" O. D.
Above 30" O. D.
Steel Balls
Below ¼" O. D.
¼" O. D. to ½" O. D.
½" O. D. to ¾" O. D.
¾" O. D. to 1" O. D.
1" O. D. to 1½" O. D.
1½" O. D. to 2" O. D.
Above 2" O. D.
(O. D.—Outside Diameter)

Blowers and Fans: Blast, Blower Type, Exhaust Drying, Forced Draft, and Industrial (excluding Turbo-blowers)—(* Dollars and units)
Shipboard Ventilating
Axial, Centrifugal, Propeller: Exhaust, Circulating
Shipboard Mechanical Draft
Axial, Centrifugal: Induced Draft, Forced Draft
Land Process and Ventilating
Axial, Propeller: Exhaust, Circulating
Centrifugal: Standard Duty, High Temperature, Heavy Duty
Land Mechanical Draft

* Unit of reporting.

Axial, Centrifugal: Induced Draft, Forced Draft

Boilers—(* Units and Total Lbs. of Steam per hour)
Land Boilers
Water tube boilers: Up to 500 lbs. psi., Over 500 lbs. psi.
Fire tube boilers: Self contained boilers, Brick set boilers
Navy Boilers
Water Tube Boilers: Up to 350 lbs. psi., Over 350 lbs. psi.
Maritime Boilers
Water Tube Boilers: Up to 350 lbs. psi., Over 350 lbs. psi.
Low Pressure Heating Boilers (* Units)

Burners, Gas and Oil—(*Units)
Gas Burners
80,000-190,000 B.t.u. Input per hour
200,000-350,000 B.t.u. Input per hour
Over 350,000 B.t.u. Input per hour
Oil Burners
0-3 gallons per hour
3.01-18.0 gallons per hour
18.01-150 gallons per hour
Combination Oil & Gas Burners

Capacitors, Power—(* Dollars)
Pole Type
250 Volts and Below
251 Volts to 600 Volts
601 Volts and above
Station Type
250 Volts and Below
251 Volts to 600 Volts
601 Volts and above

Compressors and Vacuum Pumps; Reciprocating and Rotary Units
Reciprocating compressors and vacuum pumps consist of one or more reciprocating compressing elements in which compression takes place. Under 300 HP, 300 HP and over.—(* Dollars and total horsepower)
Portable and semi-portable single acting compressors consist of one or more reciprocating compressing elements in which compression takes place on only one stroke of each revolution in each compressing element, and the entire unit including driver, air receiver, and fuel tank is mounted on a sub-base to which wheeled carriage may or may not be attached (* Dollars and units).
Rotary compressors consist of one or more compressing elements in which air or gas is compressed by centrifugal force or by positive action of rotating elements to a discharge pressure more than 50 pounds per square inch above intake pressure
(* Dollars and units)
A—Rotary Lobe Type
B—Rotary Sliding Vane Type
C—Rotary Liquid Piston Type (Nash)

Conveying Equipment, Industrial (* Dollars)
Conveyors
Belt Conveyors (Including belt) (except underground mine conveyors): Bulk Material, Package
Bucket elevators (centrifugal, continuous, gravity, discharge, pivoted bucket)
Screw or spiral conveyors
Chain conveyors (apron, flight, scraper, drag)
Gravity conveyors (roller, skate wheel)
Portable conveyors (belt and scraper)
Capacity Flow (Bulk-flo, Mass-Flo, Redler, Uni-flo)
Skip hoists
Overhead Trolley
Bins, bunkers, tanks (when used as a part of a conveying system)
Car handling equipment (dumps, pullers, loaders, spotters)
Sewage sludge collectors (circular, straight line)

Material Processing Equipment
Screens: Rotary, Vibrating
Dryers and Ovens: Rotary, Conveyor type
Magnetic separators

Electric Motor Controls (Except Fire Control)—(* Dollars)
Circuit Breakers, Knife and Safety Switches, Motor Controls and Accessories (except Gunfire Control), Panelboards, Switchboards, Toggle switches, circuit breakers, relays and contactors for aircraft.

Gas Cylinders—(* Dollars)
High Pressure—over 8¾"
High Pressure—6⅝"-8¾"
High Pressure—3 1/16"-6⅝"
High Pressure—under 3 1/16"
Low Pressure—over 12"
Low Pressure—8"-12"
Low Pressure—4"-7¾"

Heat Exchangers—(* Dollars)
Atmospheric Sections
Condensers (exclude steam surface and jet condensers)
Coolers (exclude compressor inter and after coolers, mechanical refrigeration and air conditioning coolers, radiator type coolers, unit coolers and ventilators, blast coil coolers)
Contactors, Distillers
Evaporators (exclude mechanical refrigeration and air conditioning evaporator)
Exchangers (exclude mechanical refrigeration and air conditioning exchangers)
Heaters (exclude domestic hot water heaters, service water heaters, indirect water heaters)
Heat Reclaimers, Open Sections, Reactors, Reboilers, Reflux (condensers), Steam Generators, Converters

Instruments for Indicating, Regulating, and Recording Temperature, Pressure Flow, Liquid Level, Humidity, Movement, Time and Electrical Quantities
Combat Type—(* Units)
Aircraft: Electrical, Mechanical, Electrical—Mechanical
Other than Aircraft: Electrical, Mechanical, Electrical—Mechanical
Industrial—(* Dollars)
Temperature: Thermo-electric, Expansion
Pressure and Vacuum
Rate of Flow
Other (spec.): Control Valves, Regulators, Balance

Mercury Arc Power Rectifiers—(* Dollars)

Motors and Generators, Electric—(* Dollars)
1 HP and ¾ KW and above
Navy Shipboard: Induction Motors, Direct Current Motors and Generators; Synchronous Motors and Generators
Maritime Shipboard and ABS: Induction Motors, Direct Current Motors and Generators, Synchronous Motors and Generators
All Other: Induction, Direct Current Motors and Generators, Synchronous Motors and Generators
Below 1 HP and ¾ KW
Aircraft, All Others

Pressure Vessels (Exclude gas cylinders, boilers surface heat exchangers, and industrial food processing equipment)

Pumps, Industrial—(* Dollars)
Centrifugal: Centrifugal, Propeller (sometimes called Axial Flow), Mixed Flow, Peripheral or Horizontal Turbine Type, Vertical Turbine
Rotary: Cam or Lobe, Screw, Gear, Vane
Reciprocating: Piston, Plunger, (Simplex, Duplex)
Crank and Flywheel
Power Driven, one or more cylinders
Others: Radial piston type, variable stroke pump, for transmission of hydraulic power

Speed Reducers (Worm, helical, spur, variable speed transmission)—(* Dollars)

Stokers—(* Units and Total Square Feet)
Side Dump Stokers
Multiple Retort Stokers
Chain or Traveling Grate Stokers
Spreader Stokers
Stokers for Low Pressure Heating Boilers

Switchgear—(* Dollars)

Transformers—(* Dollars)
Single Phase: Under—1½ KVA, 1½ to 10 KVA, 11 to 50 KVA, 51 to 500 KVA, 501 to 2500 KVA, 2501 and larger
Polyphase: Under—1½ KVA, 1½ to 10 KVA, 11 to 50 KVA, 51 to 500 KVA, 501 to 2500 KVA, 2501 and larger
Specialty Transformers: Under—7½ KVA, 7½ to 100 KVA, 101 KVA and larger

Tubes, Electronic—(* Dollars)

Turbines, Steam, Hydro and Gas—(* Total Horsepower)
Steam Turbines
Navy Shipboard: For generator drives, For mechanical drives, For propulsion
Maritime Shipboard: For generator drives, For mechanical drives, For propulsion
Land: For generator drives, For mechanical drives
Gas Turbines: For generator drives, For mechanical drives
Hydraulic Turbines: Vertical shaft, Horizontal shaft

Turbo-Blowers and Exhausters—(* Units and Dollars)
(Any mechanically operated centrifugal or rotary type machine for compressing air or gas from an initial inlet pressure to a higher discharge pressure, such that the compression ratio or net differential pressure is not less than 1½ lb. gauge nor more than 50 lb. gauge. Does not include those used as compressing units of refrigeration or air conditioning equipment.)
Centrifugal: Single stage, Multistage, Blast furnace, Axial Flow Multistage, Rotary Lobe Type, Rotary Sliding Vane Type, Rotary Liquid Piston Type (Nash)

* Unit of reporting.

* Unit of reporting.

CLASS B—GROUP II LIST

Abrasive Wheels, Stone, Paper, Cloth and Related Products; Asbestos End Products; Atmosphere Converters, Glue Pots, Ovens, Heat Treating Devices; Automotive Accessories and Replacement Parts

Bags; Bolts, Nuts, Nails, Screws, Rivets, Washers, Tacks, Cotter Pins, Eyelets, and Pins; Borers (Earth); Bulldozers (Tractor Mounted); Bus Supports & Fittings

Canning and Dehydration Machinery and Equipment; Carbon Brushes and Industrial Carbon Products; Central Office and Switchboard Equipment; Ceramic Manufacturing Machinery and Equipment; Chains; Chemical Producing Machinery.

Commercial Cooking and Food and Plate Warming Equipment; Commercial Laundry and Dry Cleaning and Tailors' Pressing Machinery; Consumers Durable Goods; Containers and Closures (excluding Blitz Cans); Cork Products; Cranes, Hoists and Monorail Systems; Cranes and Shovels, Crawler Mounted; Cranes and Shovels, Motor Truck Mounted; Cultivators and Weeders.

Dairy Farm Machines and Equipment; Discs (Road); Distributors (Bituminous); Distributors (Water Pump); Ditches; Domestic Cooking Appliances and Heating Stoves; Domestic Laundry Machinery; Domestic Water Systems; Draglines; Dredges; Drill Bits and Drill Rods; Drills (Core and Portable Well); Drug (Pharmaceutical and Cosmetics Machinery and Equipment); Dust Collecting Equipment.

Edible Oils Machinery and Equipment; Electrical Conduit and Metal Raceways; Electroplating and Anodizing Equipment; Elevators; Engineering and Drafting Tools and Equipment.

Fabricated Metal Building Products (such as moveable partitions, window frames, wire mesh, etc.); Farm Elevators and Blowers; Farm Poultry Equipment; Farm Wagons and Trucks (Not Automotive); Fibrous Glass Products; Finishers, Paving and Floor.
Fire Extinguishing, Alarm, and Protective Systems, Devices and Equipment; Fittings, Pipe; Floodlights and Searchlights under 12"; Floor Finishing, Floor Maintenance and Industrial Vacuum Cleaner Machinery and Equipment; Food and Beverage Machinery; Foundry Machinery, Equipment and Supplies (except Furnaces).

Gages and Machinists' Precision Measuring Instruments and Testing Machines; Graders; Grain Handling and Processing Machinery and Equipment.

Hammers (Jack); Hammers (Pile Driving); Hardware; Harrows, Rollers, Pulverizers and Stalk Cutters; Haying Machinery; Hoists; Hose, Metallic.

Industrial Explosives and Accessories; Industrial Safety Equipment; Insulators and Pole Line Hardware.
Laboratory Equipment; Lamps and Bulbs; Lightning Arrestors; Liquified Petroleum Gas Equipment; Lubricating Equipment and Fittings.

Machine Tool Attachments and Accessories; Machine Tools; Maintainers; Maintenance and Repair Parts (exclusive of combat items); Mechanical Power Transmission Equipment Other than Speed Reducers; Medical and Dental Equipment.
Metal Closures; Metal Cutting Tools; Metal Forming Machines; Metal Strapping; Metallic Packing; Mining Machinery and Equipment; Miscellaneous Farm Equipment; Mixers.

Office Machinery; Oil Well Equipment and Accessories; Outside Plant Equipment (Communication).

Packaging and Labeling Machinery and Equipment; Pavers (Concrete); Planting, Seeding and Fertilizing Machinery and Attachments; Plants (Asphalt, Batching, Crushing, Screening, Washing); Plows and Listers; Plows (Snow); Plumbing Fittings and Supplies and Plumbers' Specialties such as Fixture Fittings and Trim.
Plumbing Fixtures; Plumbing and Heating Tanks; Portable Electric and Pneumatic Tools; Power Control Units, Tractor Mounted; Power Transmission, Electrical, Not Covered in Group I List; Presses (Baling); Printing and Publishing Equipment; Pulp, Paper and Paper Products Machinery.

Radiators; Railroad and Transit Maintenance of Way Work Equipment; Railroad and Transit Signal Equipment; Railroad and Transit Track Equipment.
Refrigeration and Air Conditioning Machinery

and Equipment (Industrial and Commercial); Rollers; Rooters; Rubber Producing Machinery; Rubber Working Machinery.

Scales and Balances; Scrapers; Small Tools; Sprayers, Bituminous; Sprayers, Dusters and Orchard Heaters; Spreaders, Concrete Paving; Subgraders and Finegraders; Subscriber Station Equipment (Communication); Surgical Furniture; Surgical Instruments and Equipment, except direct purchases of the Army or Navy; Sweepers, Pickup.

Telegraph Equipment; Textile, Clothing, Shoe and Leather Machinery; Tire Retreading, Recapping and Repairing Equipment and Machinery; Tires and Tubes; Tobacco, Machinery and Equipment; Tractors (Track-Laying); Trucks (Hand Industrial); Trucks, Power Industrial (exclusive of Highway Type); Tube Cleaners; Tube Expanders
Unit Heaters; Valves; Vises.

Warm Air Furnaces; Water Conditioning Equipment and Apparatus, except Water Purification Plants Purchased by the Army or Navy; Welding Equipment; Welding Rods and Electrodes; Winches and Hoists, Tractor Mounted; Wire Drawing Machinery; Wire Working Machinery; Wiring Devices and Supplies: including Electric Fuses; Woodworking Machinery.
X-Ray and Physiotherapy Equipment.

CMP MATERIALS LIST

(Units: pounds except for wood)

Controlled Materials:
Aluminum, Copper and Copper Base Alloys, Steel.

Other Materials:
*Beryllium; *Cadmium; *Cobalt—other than in steel; Cordage Fibers—Manila, Sisal, Jute, Istle; Magnesium; Mercury; Mica—other than ground mica; Monel—natural; *Nickel—other than in steel; Nylon; Rayon—high tenacity; Rubber—Crude and Buna "S", Liquid Latex, Reclaimed, Synthetic; *Tin—other than on tin plate; *Tungsten—other than in steel; Wood; *Zinc.

ALUMINUM PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
	Bar and rod (excluding requirements for stock for wire, forgings, rolled structural shapes, and electrical cable)	201-02
	By sizes [Maximum diameter (for rounds and ovals). Maximum distance between faces (for squares, hexagonals, octagonals and rectangles)]:	
	4021 ⅜"-¾" inclusive; 4031 Over ¾"-1⅝" inclusive; 4041 Over 1⅝"-3" inclusive; 4051 Over 3".	
	4121 Wire, excluding rivet wire.—Wire covers maximum diameters under ⅜" in rounds, ovals, squares, hexes, octagonals, and rectangles	201-05
	4122 Rivets	201-05
	4151 Cable (electrical transmission only)	201-06
	4171 Forgings and pressings (before machining)	201-09
	Castings from high-grade ingot* (before machining):	
	4202 Cylinder heads for air-colled radial engines	201-11
	4203 Other heat treated sand castings	201-11
	4204 Non-heat treated sand castings	201-12
	4205 Heat treated permanent mold castings	201-13
	4206 Non-heat treated permanent mold castings	201-14
	4207 Cold-chamber die castings	201-15
	4208 Gooseneck die castings	201-15
	Castings made from low-grade ingot* (before machining):	
	4213 Heat treated sand castings	201-11
	4214 Non-heat treated sand castings	201-12
	4215 Heat treated permanent mold castings	201-12
	4216 Non-heat treated permanent mold castings	201-14
	4217 Cold-chamber die castings	201-15
	4218 Gooseneck die castings	201-15
	4251 Rolled structural shapes (angles, channels, zees, tees, etc.)	201-22
	Extruded shapes	
4301	2S, 3S, 53S, and 61S alloys	201-27
4311	All alloys except, 2S, 3S, 53S, and 61S	201-28
	Sheet, strip and plate—excluding stock for foil, impact extrusions, and forgings	
4331	2S and 3S alloys	201-37
4361	Alloys other than 2S and 3S	201-38
	Tubing*	
4401	2S and 3S alloys	201-46
4411	Alloys other than 2S and 3S	201-47
4501	Powder	201-51 201-52 201-53 201-54 201-55
4601	Foil (.005" and thinner)	201-71
4701	Impact extrusions	201-73
	Ingot—excluding ingot for aluminum castings, sheet, plate, strip, rod, bar, extrusions, and powder	201-19
4801	High grade*	
4811	Low grade*	

*Metallic content of alloys must be computed.

*Low grade ingot means any aluminum which contains copper in excess of 4% by weight, and either iron or zinc in excess of 1% by weight.

MAGNESIUM PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
5001	Extrusions: excluding extruded stick and forging stock	217-02 217-23 217-45
5051	Forging, before machining	217-09
5101	Sand Castings, heat treated, before machining	217-11
5111	Sand Castings, not heat treated, before machining	217-12
5201	Permanent and semi-permanent mold castings, heat treated, before machining	217-13
5211	Permanent and semi-permanent mold castings, not heat treated, before machining	217-14
5301	Die Castings, before machining	217-15
5401	Ingot and extruded stick, excluding requirements for ingot for magnesium; castings; extrusions; sheet, strips, and plate; and powder	217-19 217-75
5501	Sheet, strip, plate	217-30
5601	Powder	217-81 217-82 217-83 217-84 217-85 217-86 217-87 217-91 217-92 217-98 217-99

COPPER PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
	Brass Mill Products	
	(A) Copper Base Alloys	
3001	Ammunition Cups, discs and slugs	no number
3011	Sheet and strip (other than cups and discs)	206-32 207-32 222-32
3021	Rods, bars, and wire (including extruded shapes, not including slugs)	206-04 206-08 206-23 207-04 207-08 207-23 222-02 222-05 222-23
3041	Tubing or pipe	206-41 206-42 206-43 207-41 207-42 207-43 222-40 241-00 (1)
	(B) Copper	
3051	Plate, sheets and strip	212-32
3061	Rods and bars, including extruded shapes (not including wire bars and ingot bars)	212-19
3071	Tube and pipe	212-41 212-42 212-43
	Wire Mill Products	
	Copper	
3101	Wire and cable (including copper content of insulated wire and cable)	212-08
	Foundry Products	
	Copper and Copper Base Alloys	
3201	Castings	206-10 207-10 212-10 222-10

*Summarizations on basis of these codes should avoid duplication. Cupro-nickel (code 241-00 in Official Classification List of Raw and Basic Industrial Materials) should be divided into appropriate shapes under Brass Mill Products—Copper Base Alloys.

COPPER DEFINITIONS

A brass mill product means sheet, wire (other than electrical), rod or tube made from copper or copper base alloy.

A wire mill product means bare or insulated wire or cable for electrical conduction made from copper.

A foundry product means cast copper or copper base alloy shapes or forms suitable for ultimate use without rolling, drawing, extruding. The process of casting includes the removal of gates, risers and sprues, and sand blasting, tumbling or dipping, but does not include any further machining or processing.

Copper base alloy means any alloy in the composition of which the percentage of copper metal by weight equals or exceeds 40% of the total weight of the alloy.

Gross weight of copper or copper base alloy product is defined as the weight of the product delivered from a brass mill, wire mill or foundry.

Net weight of copper or copper base alloy product is defined as the weight of the material in the finished item.

ZINC PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
	Zinc	234-05 234-10 234-19 234-33 234-59 234-91 234-92 234-93 234-94
	By grades:	
7115	Special high grade, high grade and intermediate—zinc content of 99.5% or higher	No number
7117	Brass special, selected, and prime Western	No number

*Summarizations on basis of these codes should avoid duplication.

STEEL PRODUCT CLASSIFICATION

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
	Carbon Steel (Grades 00, 10, 11 and 13)	
2001	Bars, cold finished	103-85 103-86 103-87
2005	Bars, hot rolled	103-81 103-82 103-83 103-84 125-81
2011	Ingot, billets, blooms, slabs, tube rounds, skelp and sheet and tin bar	119-00 161-00 139-00
2016	Pipe	145-86 145-87 145-88
2021	Plates	135-81 135-82 135-83 135-84 135-85 135-86 135-87
2026	Rails and track accessories	162-81 162-89 164-00
2031	Sheets and strip	131-80 131-81 131-82 131-83 131-84 131-85 131-86 131-87 131-88 131-89 131-90
2036	Steel Castings	110-81 110-82 110-83 110-89
2041	Structural shapes and piling	125-82 125-83 163-81 163-82
2046	Tin plate, terne plate, and tin mill black plate	165-00
2051	Tubing	145-80 145-81 145-82 145-83

	145-84
	145-85
2056 Wheels and axles	167-00
2061 Wire rods, wire, and wire products	105-81
	105-82
	105-83
	105-84
	105-85
	105-86
	105-89

Alloy Steel—Including Stainless
(all other grade codes)

2501 Bars, cold finished	103-85
	103-86
	103-87
2505 Bars, hot rolled	103-82
	103-83
	103-84
2511 Ingots, billets, blooms, slabs, tube rounds, sheet bar	119-00
	139-00
	161-00
2516 Pipe	145-86
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	145-88
2521 Plates	135-81
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2536 Steel castings	110-81
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	110-89
2551 Tubing	145-80
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	145-83
	145-84
	145-85
2556 Wheels and axles	167-00
2561 Wire rods, wire, wire products	105-81
	105-86

DEFINITIONS

Carbon Steel:

All Steel other than alloy steel.

Alloy Steel:

Steel is classified alloy when the maximum of the American Iron and Steel Institute standard ranges given for alloying elements exceeds one or more of the following limits:

Manganese in excess of 1.65% maximum;
Silicon in excess of 0.60% maximum;
Copper in excess of 0.60% maximum;
Aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium, or any other alloying element in any amount specified or known to have been added to obtain a desired alloying effect.

Bars, Hot Rolled:

Concrete Reinforcing Bars.—These are hot rolled from billet steel, rail steel, or steel axles, and are further described as plain or deformed bars, used to resist tension, compression, or shear forces in concrete.

All Other.—These include rounds, half rounds, ovals, half ovals, squares, flats, hexagons, octagons, special sections and angles, channels, tees and zees, under 3" maximum cross-sectional dimension but excluding angles, tees, zees, channels and beams 3" and larger in maximum cross-sectional dimensions (see Structural Shapes below). Hot rolled bars are produced from billets or blooms to specified dimensions within standard tolerances without subsequent processing of the bars for accuracy or surface polish. They are commonly cut into straight lengths but in small sizes may be produced in coils.

For complete details as to description of hot rolled carbon steel bars and alloy steels see Steel Products Manuals covering these products, issued by the American Iron and Steel Institute.

Bars, Cold Finished.—Cold finished steel bars are produced from hot rolled material by several cold finishing processes, for the purpose of removing decarburization, improving surface finish, dimensional accuracy, alignment, or machinability; also in the case of cold drawn and cold rolled material, to increase the yield strength and tensile strength. Cold reduction processes and surface improvement processes used singly or in combination include cold drawing, cold rolling, turning, grinding, polishing, and straightening.

Semi-Finished Steel:

Ingots.—Ingots are steel castings of different shapes and sizes in an unworked condition and of suitable form for subsequent working by rolling or forging.

Blooms, Billets, and Slabs.—Are hot-rolled or forged from ingots to approximate cross-sectional dimensions with rounded corners.

Forging Quality Blooms, Billets, and Slabs; Squares not less than 4 x 4" cross section dimension. Rectangles other than squares minimum cross sectional area 16 square inches; minimum thickness 2".

For complete details as to description of semi-finished products see Steel Products Manuals covering Carbon Steel Semi-finished Products and Alloy Steels, issued by the American Iron and Steel Institute.

Tube Rounds.—Rounds used for manufacturing seamless pipe and tubing.

Skelp.—Flat rolled steel used for the manufacture of welded pipe.

Sheet and Tin Bar.—Slabs used for re-rolling into sheets and tin plate.

Pipe:

Standard.—Standard pipe is used for conveying air, gas, steam, water, oil, and other fluids for miscellaneous purposes at relatively low pressures.

Line.—Line pipe is used for distance transportation of water, gas or oil.

Oil Country Goods.—Oil Country Goods is a collective term applied in the oil and gas industries for three kinds of pipe used in wells; namely, casing, tubing and drill pipe.

Plates:

Comprise that group of flat, hot rolled, finished steel products which includes:

3/16" (0.1875 in.) or thicker, over 48" wide, for carbon steel.
3/16" (0.1875 in.) or thicker, over 10" wide, for stainless steel.
1/4" (0.250 in.) or thicker, over 6" wide, for carbon steel.
1/8" (0.250 in.) or thicker, over 12" wide, for alloy steel (except stainless).
7.65 lb. per square foot or heavier, over 48" wide, for carbon and alloy steel.
10.2 lb. per square foot or heavier, over 6" wide, for carbon steel.
10.2 lb. per square foot or heavier, over 12" wide, for alloy steel.

Plates are produced either from slabs or direct from ingots by hot-rolling. They are termed sheared plates or sheared mill plates when rolled between horizontal parallel rolls only, and trimmed on all edges. They are termed universal plates or universal mill plates (abbreviated U. M. plates) when rolled between horizontal and vertical parallel rolls, and trimmed on the ends only.

Rails and Track Accessories:

Includes rails; angle bars, fish bars, fish plates, rail joints, splice bars, clip bolts, cut track spikes, frogs and switches, gage rods, guard rail clamps, guard rails, nut locks, rail anchors, rail clips, screw spikes, switch stands, tie plates, track bolts, S-irons and rail braces.

Sheets and Strip:

This group comprises: Flat rolled carbon products which include .2499" to and including .2030" thick, over 6" to and including 48" wide; .2029" to and including .1875" (3/16") thick to and including 48" wide; under .1875" thick, any width mill can produce;

Stainless flat rolled products up to but not including .1875" (3/16") thick, any width;

Alloy flat rolled (except stainless) products up to but not including 1/4" thick, any width.

Steel Castings:

Cast steel is steel that is poured into and allowed to solidify in metal or refractory moulds. Steel castings are any cast steel objects that do not require further mechanical working.

Structural Shapes and Piling:

Structural Shapes.—General term applied to flanged sections (3" and over cross-sectional dimension), including Channel, I, L, Z, or T shapes, for construction of buildings, bridges, ships, transmission towers, railroad cars and many other structural purposes.

(1) American Standard Sections is the designation applied to the series of I-beams, channels, and large angles originally established in 1896 by the Association of American Steel Manufacturers.

(2) Wide Flange Sections are those I- and H-shaped beams and columns that are rolled on mills having both vertical and horizontal rolls, by which method it is possible to produce flanges much wider than those of the standard beams, with inside and outside faces of the flanges parallel or with a very slight taper on the inside face.

Piling.—Steel sheet piling consists of rolled steel shapes having interlocks along two opposite edges rolled integrally, for the purpose of interlocking the edges of each unit to the edge of adjacent similar unit in order to create a continuous steel wall.

Tin Plate, Terne Plate, and Tin Mill Black Plate:

Includes hot rolled, cold rolled, hot dip and electrolytic tin and terne plate. Tin mill black plate is a flat rolled product .0141" and thinner in thickness, over 12" to 32" inclusive wide.

Tubing:

Mechanical.—Welded or seamless in standard or special shapes and sizes to standard or special tolerances, hot finished or cold drawn, used for a variety of mechanical purposes without being hydrostatically tested.

Pressure.—Include boiler tubing and other tubing subject to heat and pressure; tubing of various types subject to water and steam, internal and external pressure at elevated temperatures. Sizes refer to actual outside diameter and minimum wall thickness.

Wheels and Axles:

Wheels.—Wrought steel wheels are steel wheels for railroad and transit service, formed by heating steel blocks to a malleable condition and subsequently forming to size by a series of forging and rolling operations.

Axles.—A steel axle is a special shaft or spindle on which a wheel is mounted, that is made from a bloom or billet heated to a malleable condition and subsequently forged to desired shape.

Wire Rods, Wire, and Wire Products:

Includes wire rods, drawn wire, barbed and twisted wire, woven wire fence, wire nails and staples, wire bale ties, wire rope and strand, welded fabric, and all other wire products.

Examples for Use in Determining Gross Weight

Forgings.—Weight of billet, bloom, or bar used to produce forging, including allowance for bar ends, etc.

Castings.—Rough casting weight before machining, less sprues, risers, etc.

Parts made from Sheet or Plates.—Weight of sheet or plate required to make the specified part. Where more than one piece is obtained from a sheet or plate, the weight should be distributed according to the amount of material used to produce each piece.

WOOD PRODUCT CLASSIFICATION

Lumber (Unit: Board feet).

Aircraft, Boats, Ships, Barges, Lighters, Pontoon Bridges—Show thickness, length and species.

Vehicles: Show thickness only.

All other lumber: Omit thickness, length and species.

A four digit code will be used as follows:

In the case of lumber, the first two digits from the left will indicate the species in accordance with the table for lumber below.

The third digit from the left of the number will indicate length, in the case of lumber, in accordance with the table below.

The fourth digit from the left (last digit) will indicate thickness, in the case of lumber, in accordance with the table.

FOR LUMBER

Species Table (First and second digits from the left):

00. Softwood (Species not necessary).
00. Hardwood (Species not necessary).

Softwood:

01. Douglas Fir.
02. Sitka Spruce and Alternates.
03. Ponderosa Pine.
04. Southern Yellow Pine.
05. Other Softwood.

Hardwood:

06. Birch.
07. White Oak.
08. White Ash.
09. Gum.
10. Black Walnut.
11. Yellow Poplar.
12. Mahogany.
14. Other Hardwood.

Length Table (Third digit from left):

0. Length not shown (in case of vehicles, etc., as above).
1. 16′ or less.
2. Over 16′ but not over 24′.
3. Over 24′ but not over 32′.
4. Over 32′ but not over 40′.
5. Over 40′.

Thickness Table (Fourth digit from left):

0. No thickness indicated.
1. 2" or less.

2. Over 2" but not over 4".
3. Over 4".

Plywood — Interior Grade (Non-waterproof) (Unit: Square Feet).

A four digit code will be used as follows:

In the case of interior grade plywood the first two digits from the left will indicate the species in accordance with the species table below.

In the case of plywood the third digit from the left will indicate the number of plies in accordance with the ply table below. For softwood plywood the code "9" is to be used since the number of plies need not be specified for softwoods.

The fourth digit from the left is to indicate thickness in accordance with the thickness table below. For softwood plywood the code "4" is to be used since softwood plywood is to be reported on a 3/8 inch basis.

Plywood—Exterior Grade (Waterproof) (Unit: Square Feet).

A four digit code will be used as follows:

In the case of exterior grade plywood the first two digits from the left will indicate the species in accordance with the species table below.

In the case of plywood the third digit from the left will indicate the number of plies in accordance with the ply table below. For softwood plywood the code "9" is to be used since the number of plies need not be specified for softwoods.

The fourth digit from the left is to indicate thickness in accordance with the thickness table below. For softwood plywood the code "4" is to be used since softwood plywood is to be reported on a 3/8 inch basis.

FOR PLYWOOD

Species Table (First and second digits from the left):
Softwood:
01. Douglas Fir.
05. Other Softwood.
Hardwood:
06. Birch.
07. White Oak.
09. Gum.
10. Black Walnut.
11. Yellow Poplar.
12. Mahogany.
13. Hard Maple.
14. Other Hardwood.

Ply Table (Third digit from the left):
6. Three ply.
7. Five ply.
8. Seven ply and over.
9. Ply unspecified.

Thickness Table (Fourth digit from the left):
1. 1/8 inch or less.
2. 1/8 inch—1/4 inch.
3. 1/4 inch—1/4 inch.
4. 3/8 inch.
5. 1/2 inch—5/8 inch.
6. 3/4 inch and over.

Note: Express wood products only on a gross basis.

CMP Materials Code Number		*Code in Official Classification List of Raw and Basic Industrial Materials
5615	Beryllium	204-00
		204-91
		204-92
		204-93
5715	Cadmium	208-19
		208-91
		208-92
		208-93
5815	Cobalt other than in steel	210-00
		210-91
		210-92
		210-93
	Cordage Fibers	
1400	Manila	482-81
		482-82
1402	Sisal	487-00
1404	Jute	480-00
1406	Istle	479-01
		479-02
		479-03
		479-04
6515	Mercury	218-00
		218-91
		218-92
8800	Mica	354-80
		354-81
		354-82
		354-83
		354-84
		354-85
		354-86
		354-87
		354-88
		354-89
		355-80
		355-81
		355-82
		355-83
		355-84
		355-85
		355-86
		355-87
		355-88
		355-89
6615	Monel—Natural	220-02
		220-05
		220-10
		220-20
		220-33
		220-40
6715	Nickel—other than in steel	221-02
		221-05
		221-10
		221-20
		221-33
		221-40
		221-91
		221-92
		221-93
		221-98
1620	Nylon	483-00
1650	Rayon—High Tenacity	484-81
		484-82
		484-83
1850	Rubber—Crude and Buna S	485-81
		745-01
1855	Rubber—Latex	485-82
1860	Rubber—Reclaimed	485-83
1865	Rubber—Synthetic	744-00
		745-00
		745-02
		745-03
		745-04
		745-05
		745-09
6915	Tin—Other than on tin plate	229-20
		229-71
		229-91
		229-92
		229-98
7015	Tungsten—other than in steel	231-00
		231-50
		231-91
		231-92
		231-93

*Summarizations on basis of these codes should avoid duplication.

Production Requirements Plan

The Production Requirements Plan, although scheduled to be supplanted next year by the Controlled Materials Plan, will be the basic system for distribution of raw material during the first quarter of 1943.

Companies operating under PRP were required to file their PD-25A applications, covering first quarter needs, by Oct. 25. Certificates authorizing the use of specific ratings to purchase stated quantities of materials are due to be issued shortly by WPB.

Several changes in Priorities Regulation No. 11 were made Nov. 16 and affect operation of PRP units during the coming quarter. Chief of these revisions follow:

1.—The period of time within which a PRP unit must cancel or postpone its purchase orders, so that the ratings and quantities do not exceed authorization on its PRP certificates, was extended to seven days, including Sundays, after receipt of the particular certificate, instead of five working days.

2.—A PRP unit may accept delivery of material in excess of its authorization, if the materials were in transit when the supplier received notice of cancellation or postponement, provided such notice was received by the supplier not later than ten days after receipt of the unit's certificate.

3.—A PRP unit may accept delivery of materials other than, or in excess of, those authorized on its PRP certificate to the extent that it is entitled to extend AAA ratings.

4.—A PRP unit which filed an application for ratings for materials to be used during the second quarter of 1943 on Section H of the first quarter PD-25A application, may employ the interim procedure with regard to such material, pending the return of its PD-25A for the first quarter.

5.—Any PRP unit which receives during a quarter any listed material other than, or in excess of, the quantities authorized by its PRP certificates, or by specific authorization of the Director General for Operations, must report promptly such receipts to WPB, together with a statement of the reasons why such receipts were necessary, and citing the provisions in Regulation 11 which permit such receipts.

6.—A revision of paragraph (k) of Regulation 11 makes it clear that, although a PRP unit failed to file a PD-25A application on the date specified, it may, as soon as it has filed such application, apply ratings to its purchase orders.

7.—The Metals List of Regulation 11 was revised so as to include only those items appearing in Materials List No. 1, revised, of the PD-25A application form for the first quarter of 1943, and specifically excludes insect wire screen cloth from the forms of metal on the list.

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Priority, Allocation and Limitation Orders

Issued by the War Production Board,
New Social Security Building, Washington, D. C.,
Telephone Republic 7500.

"M" ORDERS

M-1-d: Aluminum Scrap, effective Jan. 7, 1942, revoking P-12 and M-1-c. Latter, effective June 10, 1941, revoked M-1-b which became effective April 11, 1941. Prohibits use of scrap, except home scrap, without authority of Dir. Gen. for Oper. Does not apply to virgin aluminum producers or approved smelters. Beginning March 1, 1942, every plant generating 1000 pounds or more of scrap per month must segregate scrap at the machine. All 17S, 24S and 52S alloy scrap in solid form must be sold to Aluminum Co. of America or Reynolds Metals Co., all other segregated scrap to these companies, approved smelters or dealers. Identity of segregated scrap must be certified to by seller. Order affects only scrap containing 15% or more aluminum by weight.

M-1-g: Aluminum Pigment, Paint, effective March 10, 1942. Prohibits manufacture or sale, except retail, unless Director of Industry Operations approves application made on PD-312. Pigment manufacturers and paint formulators and jobbers report stocks to WPB by 15th of April and each succeeding month.

M-1-h Bauxite and Alumina, effective Aug. 1, 1942. Provides full allocation. Requests for authority to accept delivery made on PD-567 (for bauxite) or PD-568 (for alumina). Material on hand may be used without authorization until Sept. 1, 1942, at not over rate of 1941 second half.

M-1-i: Aluminum, effective Aug. 18, 1942, revoking M-1-e and M-1-f; last amended Nov. 20, 1942. Provides for complete allocation control of virgin and secondary metal. Each producer, approved smelter and fabricator must file, on PD-26A, a shipping schedule for each month by 15th of the second preceding month. Only following items eligible to be included on PD-26A except when otherwise approved by the Director: Implements of war; alloys, other than zinc base alloys, with monthly weight limited to 12% of total produced and aluminum content of any alloy limited to not more than 15 per cent by weight; carbometer wire; cathodes for electrolytic refining of zinc; chemical processing equipment; commercial aircraft; containers for intravenous solutions; fixed electrolytic and paper condensers; orthopedic equipment; repair and maintenance parts for mechanical or electrical equipment; thermit reaction; welding rod and metallizing wire; X-ray tube housings.

Only low grade aluminum will be allowed for the following: anhydrous aluminum chloride; match plates, patterns, core boxes, core dryers, and snap flasks; pistons for engines in 1½-ton and larger trucks, heavy duty tractors, diesel engines and engines in portable fire-fighting equipment; steel deoxidizer; portable electric and pneumatic tools; zinc base alloys. Users must file an inventory report on PD-40A by 20th of month after end of each quarter. All toll agreements must be authorized by the Director on PD-114.

M-2: Magnesium, effective March 24, 1941: M-2-a, supplementary order, effective March 24, 1941; M-2-b, supplementary order, effective Nov. 14, 1941, revokes M-2.
Applies to all materials and products, including scrap, principal ingredient of which is magnesium. Deliveries are subject to monthly allocation by Dir. Gen. for Oper. Magnesium products may be used only on orders carrying a rating of A-1-j or higher. Alloying any material with magnesium without approval of Director General for Operations prohibited. All material, in whatever form, not being used to fill orders with ratings of A-1-j or higher, must be disposed of to a producer or approved smelter.
Producers, fabricators, secondary smelters must file PD-26-m monthly by the 20th with Aluminum and Magnesium branch, giving shipping schedules. Users report inventories by the 15th on PD-40M; stocks, receipts, disposition reported on PD-173 for magnesium and products, on PD-174 for powder metal.

M-6: Nickel, effective May 15, 1941; Revoked by General Preference Order M-6-a, effective Sept. 30, 1941. Deliveries to be made by producers and distributors only as authorized by Director General for Operations, except to Metals Reserve Co. Amendment, March 30, 1942, extends order to cover nickel salts, oxides, carbonates and solutions, concentrates and residues from which nickel commercially recoverable.

M-6-b: Nickel effective Jan. 20, 1942, last amended Oct. 3, 1942. Restricts use, except where specifically authorized, to implements of war and other products certified by Army-Navy Munitions Board.

M-6-c: Nickel Scrap, effective April 23, 1942. Requires segregation by all persons handling nickel scrap. Dealers may make deliveries only to melters being allocated nickel and for use in

products for which allocation made, or to melters with orders requiring nickel and rated higher than A-2. Persons generating scrap containing more than 500 lbs. of contained nickel per month or who have that amount on hand at end of month, or who have on hand at end of month more than 30 days' accumulation of scrap they produced (if nickel content more than 100 lbs.) required to report by 15th of each month. Use PD-149, 150, 151 for iron and steel scrap, PD-394 for other nickel scrap and secondary nickel.
Amendment, June 19, 1942, requires segregation of ferrous nickel scrap in same manner as provided in M-24-c. Order provisions cover scrap containing 1% or more nickel. Dealers prohibited from melting scrap without authorization of Director of Industry Operations.

M-8: Cork, effective May 31, 1941. Expired Sept. 30, 1941. M-8-a, effective Oct. 1, 1941.

M-9: Copper, effective May 29, 1941; superseded by **M-9-a,** effective Aug. 2, 1941; **M-9-a** amended Jan. 7, Feb. 6, 25, May 7, Aug. 1, 1942. Deliveries by refiners, dealers, brass mills or wire mills must be authorized by Dir. Gen. for Operations. Details regarding WPB Order prohibits sale of copper and its products by mills, or foundries except on A-1-k or higher rating; by warehouses on AA-5 or higher. All users file PD-59D as revised to apply for monthly requirements for domestic consumption. Control of allocation of copper to foundries and ingot makers is placed in M-9-b.
Refiners file PD-61 monthly, listing production and shipments of duty free copper.
PD-76 is copper allocation certificate; PD-123 is delivery report.

M-9-b: Copper and Copper-Base Alloy Scrap and copper base alloy brass and bronze) ingots, effective Sept. 30, 1941, amended Dec. 31, 1941, March 31, May 9, Aug. 1, 1942. "Copper base alloy" means any alloy analyzing 40% or more copper by weight. "Ingot" means an ingot or other shape for remelting. "Brass mill scrap" means scrap which is by-product of industrial fabrication of products produced by brass mills.
Brass mill scrap may be delivered only to a scrap dealer or brass mill. Dealers may deliver only to another dealer or brass mill. No. 1 or 2 copper and scrap may be delivered only to a dealer or person specifically authorized by Director General for Operations. Scrap other than brass mill, No. 1 or No. 2 copper scrap may be delivered only to a scrap dealer or person authorized by Director of Industry Operations. A scrap dealer may not accept additional scrap if inventory exceeds amount sold during the preceding 60 days. Ingots may be delivered only on specific authorization.
Alloy ingots can be delivered only to a person authorized by the Director General for Operations.
Fabricators, except railroads and utilities, may not use or remelt scrap produced in their own operations, or dispose of it except by sale, without permission. No fabricator may keep more than 30-days' scrap accumulation, unless total is less than 5 tons. No copper or brass mill scrap may be delivered under future conversion or toll agreements, unless approved by Dir. Gen. for Oper. Obsolete scrap wire or cable used by public utility in own operations must be over 5 ft.; monthly use limited to 5 tons.
Allocation certificates must be surrendered by foundries and ingot makers to dealers when orders placed.
Industrial producers of more than 2000 lbs. monthly file PD-226 by 10th of each month. Foundries using scrap or ingots use PD-59 revised and PD-123 revised.

M-9-c: Use of copper or copper base alloy in manufacture of any one of more than 100 civilian articles banned after Jan. 1, 1942. Amendment, Dec. 8, 1941, exempts certain industrial items.
Amendment, Feb. 28, 1942, permits copper use for essential operating, maintenance and repair parts for railroad cars, locomotives, equipment. Amendment, April 9, 1942, freezes stocks of copper screenings. Amendment, May 7, 1942, adds additional items to prohibited list. Amended, July 10, 1942, adds "Military Exemption List" to order, permitting manufacture of binoculars and valves for ship use. Amendment, July 29, adds additional items to exemption list.
Amendment, Aug. 7, permits use of copper insignia and jewelry already fabricated. Limits use in stove valves and controls; bans use in lanterns Sept. 7.
Amendment, Aug. 31, prohibits use of copper in manufacture of certain articles even for the armed services. Permitted uses named in revised "Military Exemption List".

M-9-c-1: Copper in Shoes, effective Jan. 23, 1942. Effective March 31, 1942, use of copper in making shoe findings (eyelets, hooks, etc.) prohibited, except for material in stock March 31 when no steel or non-metallic findings available.

M-9-c-2: Copper in Jewelry, effective April 4, 1942. Prohibits copper use in making jewelry after May 15, 1942.

M-9-c-3: Copper in Printing, March 28, 1942. Use of bronze powder, ink, paste and leaf by printing and publishing industry banned after May 31, 1942. Powder in hands of other than manufacturers may be used until Dec. 15.

M-9-c-4: Copper in Building, effective July 22, 1942, last amended Oct. 28, 1942. Restricts use for repairs to 25 lb. or less and then only when users possessed them on Oct. 27. Deliveries may be made only to scrap dealers, brass mills or government agencies.

M-10: Polyvinyl Chloride, effective June 9, 1941. Use Forms PD-7, PD-36. Effective Jan. 1, 1942, all deliveries, including those of vinyl polymers, subject to authorization.

M-11: Zinc, effective July 11, 1941. Amended, effective June 1, 1942, setting up complete allocation. Consumers apply to Director of Industry Operations monthly on PD-94A for allocation certificate, forwarding certificate to producer to receive shipment. Dealers report inventories and deliveries on PD-450 by 15th each month. Certificates not required to buy from dealers. **M-11-a,** effective June 1, 1942, requires zinc oxide and dust producers to set aside quantities monthly for pool, as ordered by Director General for Operations. Buyers file PD-62 to request allocation following month. **M-11-b,** July 24; last amended Nov. 26, 1942, bans use in specified articles after Sept. 1, and other specified articles after Nov. 30, 1942. Use in other articles limited quarterly to 75% for prime western 50% for all other grades used in like 1941 period. Exemptions include use for dies, precision instruments, health supplies, research laboratories, and for use to comply with safety rules and in chemical plants. Appeal may be made on PD-500.

M-14: Tungsten High-Speed Tool Steel, effective June 11, 1941; amended, effective Dec. 3, 1941. No orders to be placed or filled for tungsten-type steel if molybdenum type will fill buyer's requirements. Total deliveries of tungsten-type steel shall not exceed by weight one-third of deliveries of molybdenum-type steel in the same quarter.

M-15: Rubber, effective June 20, 1941. Superseded by M-15-b, Dec. 11, 1941. Latter revised, effective Sept. 1, 1942, to restrict use in making any civilian product to specific WPB allocations. Stocks and consumption reported by 15th each month to WPB on PD-49.
M-15-b-1, June 12, 1942, requires use of more reclaimed rubber in industrial tires. Amendment, July 1, establishes specifications for manufacture of airplane tires. Amendment, July 10, revises specifications for manufacture of insulated wire and cable. Amendment, July 21, revises specifications for additional products.
M-15-c, effective Dec. 27, 1941, restricts sales of new tires and tubes, subject to Rationing Regulation No. 1.
M-15-f, July 31, bans use of rubber cement in a specific list of articles.
Amendment, Sept. 1, bans use in manufacture of rubberized fabric for protective clothing.

M-17: Pig Iron, Aug. 1, 1941; amended Oct. 14, 1941, April 1, 1942. Customers submit monthly requirements by filing with producers by the 5th of the month on Form PD-69. By the 5th of each month customers must file Form PD-70 with Iron and Steel Branch, WPB, showing stocks, consumption and requirements for following month. Producers must file by the 12th PD-71, PD-71D, covering proposed shipments for coming month. Such shipments may not be made until approved by WPB. All tonnage allocated on PD-71C.

M-18: Chromium, effective July 7, 1941; amended, effective Aug. 22, 1941; revoked by M-18-a, effective Nov. 29, 1941. M-18-a amended Jan. 13, Feb. 4, 1942. Applies to all processors, dealers, producers and purchasers. Includes ores or concentrates, ferrochromium and combinations with other elements, chromium refractory material and scrap or secondary material. All melting and deliveries must be authorized by Director General for Operations, by WPB. Monthly use of chromium oxide for manufacture of chromium chemicals from ores or concentrates must not exceed monthly average consumption during period July 1, 1940, through June 30, 1941. Monthly requests for chromium, ferrochromium and other combinations used in making steel or for other metallurgical purposes must be made to sellers by the 20th of each month on PD-52B, with copy to WPB. PD-54 is request for chromium chemicals, due by 8th of month.

M-18-b: Chromium, effective March 26, 1942, last amended Sept. 30, 1942, Removes previous restrictions on use of chromium chemicals. Limits inventory to 30-day supply. Buyers must file PD-54 with processor and WPB by 8th of month.

M-19: Chlorine, effective July 26, 1941. Amendment, issued Dec. 20, provides for direct allocation after Feb. 1, 1942. PD-190 must accompany all orders.
Amendment, July 6, places producers' shipments of calcium hypochlorite and chloride of lime under allocation.
Producers file PD-574 with WPB by 10th each month.

M-20: Calcium-Silicon, effective, July 29, 1941; revoked by M-20-a, effective, Nov. 29, 1941. All shipments are under direct allocation by Dir. Gen. for Oper. Customers must file Form PD-72 by the

25th with supplies and WPB to obtain shipment.

M-21: Iron and Steel, Aug. 9, 1941; amended Sept. 9, 1941, April 21, 29, 1942. Applies to cast and rolled iron and steel. Deliveries after May 15, 1942, limited to orders rated A-10 or higher, except warehouse shipments of carbon steel for maintenance and repair, and nails, bale ties and small welded pipe. Orders are to be filled according to preference ratings. Accumulation of inventories beyond buyers' current needs is prohibited. Form PD-73 abolished on orders shipped after June 1, 1942, after which buyers must certify on each order material is to be used for Army, Navy, Maritime Commission, Defense Projects, Lend-Lease, Other Export, Railroad, Warehouse, or All Other purpose.
Material obtained under allocation or preference rating must be used for purpose specified. Dir. Gen. for Oper. may direct producers to make deliveries for particular purposes without regard to preference ratings. Producers must file Form PD-138 by the 10th each month with Bureau of Census to report shipments, PD-139 by the 10th to report requests for shipment. PD-169 monthly plate report due by 12th.

M-21-a: Alloy Iron, Alloy Steel, Wrought Iron, effective Sept. 16, 1941, revoking M-5, M-5-a, M-5-b, as amended. Amendments effective Nov. 25, Dec. 20, 1941. All provisions of Order M-21 are part of this order. Dir. Gen. for Oper. may specify quantities and forms of alloys in alloy iron or steel. Deliveries under toll agreements must be approved by the Director. Alloy iron or steel is defined as containing manganese in excess of 1.65%, or silicon in excess of 0.60% (5% for iron), or copper in excess of 0.60% or any other element added to obtain a desired alloying effect. Amendment, June 1, 1942, restricts filling of orders to A-1-k or higher ratings, except for certain National Emergency and other low alloy steels, which take A-3 or higher ratings. Buyers must describe end-use of material ordered. Producers melting 4000 or more lbs. of chromium and 500 pounds of nickel monthly file PD-391, 391-a and 440 with WPB monthly.

M-21-b: Steel Warehouses, effective Sept. 3, 1941. Last amended Oct. 30, 1942. Warehouse quotas of Schedule A products are limited by a quota established by WPB. Quotas for merchant products based on receipts from producers in corresponding 1940 quarter or on one-fourth total 1940 receipts. Preference rating is A-3. Warehouses must file PD-83 (Revised) by the 15th of each month with Bureau of the Census, detailing stock additions, shipments and inventories. After June 30, stocks at the end of any quarter may not exceed 1⅓ times (two times for tool steel bars) quarterly quota. Rating extensions limited by shipments from stocks.
Sales limited to orders rated AA-5 or higher except: alloy iron and alloy steel for essential repair and maintenance, A-1-k or higher; plate ends and short sheets, A-1-k or higher; tubular products and wire rope, A-10 or higher; nails, bale ties, similar wire products and roofing and siding sold primarily to the farm trade, no preference rating required.
Form PD-83B is preference rating certificate; PD-83E requests change in producers supplying products; PD-83F covers producer's shipments of Schedule B products; PD-83G is application for higher than A-1-k to A-3 ratings.

M-21-c: Steel Plates, issued Feb. 16, 1942. Includes carbon and alloy steel plates ¼-inch or thicker, over 48 inches wide; ¼-inch or thicker, over 6 inches wide; 7.65 pounds per square foot or heavier, over 48 inches wide; 10.2 pounds per square foot or heavier, over 6 inches wide. Stainless steel plate sizes are ¼-inch or thicker, 10 inches and wider: 7.65 pounds per square foot or heavier, 10 inches and wider. Customers must file PD-298 with producers by 1st of month preceding month in which shipments required. Two copies are filed with producer, one copy with Iron & Steel Branch, Plate & Shape Unit, WPB. Producers report to WPB daily and weekly by wire on plate shipments, and monthly on PD-169 and 169A on schedules for following month. Amendment, July 27, limits deliveries to rating of A-1-k or higher with certain exceptions.

M-21-d: High Chromium Steel, Jan. 6, last amended Nov. 18, 1942. Bans delivery or use of corrosion or heat-resistant alloy iron or steel containing 4 per cent or more of chromium without AA-5 rating or higher; A-1-k or higher if acquired prior to Nov. 18. Does not apply to fully fabricated articles. Persons other than warehouses possessing this material required to file PD-221 with Iron & Steel Branch, WPB, by Feb. 1, 1942.

M-21-e: Tin Plate, Terne Plate, Long Ternes, effective Feb. 3, amended May 16, 1942. Limits use for cans and closures to extent authorized by M-81 and M-104; for baking pans for institutions and commercial bakers, hot dipped tin plate up to 1.25 lbs. per base box and electrolytic plate up to .50 lbs.; for dairy equipment, hot dipped plate up to 3.30 lbs.; for cheese vats, dipped plate up to 11 lbs. per box; for gas meters, dipped plate up to 3.3 lbs., electrolytic up to .50, short ternes up to 1.30, long ternes up to 4 lbs.; for oil lanterns, short ternes up to 1.3, long ternes to 4; for textile spinning cylinders and card screens, dipped plate up to 1.25 lbs. Persons with frozen stocks required to list holdings with WPB for purchase and distribution. Amendment, July 11, permits use, for repairs of plate in process and roofing, furnace pipe and fittings in stock, on May 16. Adds other items to list for which tin and terne plate use permitted.

M-21-f: Shot and Bullet Core Steel, effective Feb. 17, 1942. Applies to steel for 20, 37, 40, 57 and 75 mm. and 3-inch armor piercing and semi-armor piercing shot, and .30 and .50 caliber bullet cores. Starting March 1 all deliveries must be made on allocation order. Producers report weekly to WPB and Army and Navy Munitions Board on PD-307. Buyers report monthly on PD-308. Amendment, May 21, adds steel for 90 mm. armor-piercing shot. Revoked Sept. 3, 1942.

M-21-g Heat-Resistant Chromium or Chromium-Nickel Alloy Iron and Alloy Steel, effective July 2, 1942. Sets up specifications for chromium and nickel content in such steels used in metallurgical furnaces, oil refineries, synthetic rubber plants, cement mill furnaces and power plant equipment.

M-22: Silk, effective July 26, 1941. Use Forms PD-77, 78, 78-a,

M-23: Vanadium, revoked by M-23-a, Dec. 20, 1941, amended June 23, 1942. Includes ores or concentrates, Ferrovanadium and combinations with other elements, chemical combinations, and scrap or secondary material containing commercially recoverable vanadium, as well as pure vanadium. Establishes full allocation, requiring deliveries to be authorized by Dir. Gen. for Oper. Processing permitted only under provisions of M-21-a. Buyers must file Forms PD-209A and 209B with WPB and 209B with suppliers by 20th each month. Reports not required for monthly deliveries up to 10 lbs. contained Va.

M-24: Scrap Iron and Steel, effective Oct. 11, 1941; last amended Oct. 13, 1942. On or before 10th of each month, producers who during preceding month produced 50 gross tons or more of scrap must report to Bureau of Mines, Pittsburgh, on Form PD-149, listing scrap inventory, production and sales. Dealers and brokers must file Form PD-151 by same date showing scrap inventory, purchases and sales. Consumers must report monthly on Form PD-150 their inventory, production, receipts and consumption. Director Gen. for Oper. has broad powers to control deliveries of scrap at his discretion.
M-24-a, March 24, 1942, prohibits sale or shipment of tinned scrap in any of 27 specified California counties, except to broker or dealer, or to detinning or copper precipitation plant there. Detinned scrap must go to copper precipitation plants. Amendment July 1, extends M-24-a application to certain Missouri, Kansas and Texas counties. Revoked Sept. 9, 1942, (see M-72-a). M-24-b, April 22, 1942, requires segregation of tin plate scrap for delivery to steel mills, prohibits mixture of such material with other scrap in bundle or car. Restrictions on consumers' inventories lifted May 23, 1942.

M-24-c: Alloy Scrap Segregation, effective June 17, 1942, last amended Oct. 13, 1942. Sets up 20 classifications of alloy steels. Requires producers of specified tonnages of scrap to segregate accumulations. Prohibits mingling of segregated scrap except in melting process.

M-25: Formaldehyde, Paraformaldehyde, Hexamethylenetetramine and Synthetic Resins, effective Aug. 23, 1941.

M-26: Silk Waste, effective Aug. 8, 1941.

M-27: Phenols, effective Aug. 30, 1941. Amended Nov. 10, 1941, to provide complete allocation. Use Forms PD-1 A, 178A, 178B; 180.

M-28: Chlorinated Hydrocarbon Refrigerants, effective Aug. 22, 1941. Use PD-161, 2, 3, 4.

M-29: Tungsten, effective Aug. 31, 1941, revoking M-3, M-3-a; last amended Nov. 27, 1942. Includes secondary material containing commercially recoverable tungsten. Buyers must file PD-9C and processors and dealers PD-9D. Authority of Director Gen. for Operations required to deliver tungsten except: in any form to MRC; in any form except in wire, rod sheet or metal powder in quantities of 25 lb. or less contained tungsten in any one month; ores and concentrates to any producer for beneficiation or to any dealer who may hold material not longer than 120 days.

M-29-b, effective Feb. 14, 1942, prohibits use of tungsten in grinding wheels, gauges, and as coloring material for rubber, linoleum, paper or similar materials after May 1, 1942. Other users must limit consumption after April 1 to 17½% of use in base year. Exemptions: Government contracts; orders with A-1-j rating or higher; safety requirements; alloy steels; welding rods; laboratory, electrical, radio, X-ray equipment; electronic relays and electric lighting uses.

M-30: Ethyl Alcohol and Related Compounds, effective Aug. 28, 1941.

M-31: Methyl Alcohol, effective Aug. 28, 1941.

M-34: Toluene, effective Aug. 28, 1941.

Placed under complete allocation, effective Feb. 1, 1942. To request deliveries, buyers file PD-223 with orders by 10th of month. Producers file PD-224 and copy of each PD-223 with Chemicals Branch, WPB. Amendment May 22, 1942, requires maximum production of toluene by oil processors and coke oven operators.

M-36 Manila Fiber and Manila Cordage, effective Aug. 29, 1941, last amended Oct. 23, 1942. Requires certificate to accompany purchase orders, naming war agency for which material requested. Cuts non-military uses.

M-37, a, b: Rayon Yarn, effective Sept. 13, 1941. Use forms PD-112, 113. PD-102, a is allocation request, PD-106 is actual allocation. M-37-c superseded 37-a, April 1, 1942.

M-38: Lead, effective Oct. 4, 1941. Refiners and dealers must file Form PD-124 with WPB by the 20th of each month, detailing proposed shipments for the following month. Lead released by Metals Reserve Co. is allocated by WPB. Consumers must file Form PD-66A by the 20th of each month with WPB Lead Commodity Branch, applying for allocation in the following month and detailing inventories. Amendment, Aug. 3, 1942, revoked supplementaly order M-38-j which had established a monthly lead pool on the basis of 15% of quantity produced in the second preceding month.

M-38-c: Lead, effective Jan. 10, 1942. Last amended Nov. 11, 1942. Bans lead use for following, April 1: Automobile body solder; ballast or keels for pleasure boats; blocks for cutting leather; ornamental glass; regalia; badges and emblems; statuary and art goods; tennis court markers; toys, weights for bats, clocks, decoys, dresses, golf clubs, jockey saddles. Exempted are uses called for by safety regulations, government contracts, orders of A-1-j or higher and in plants where corrosion makes lead imperative, building supplies on critical list for defense housing. Use PD-234 to seek exemptions. Prohibits use in buttons, costume jewelry, novelties, trophies. Lead foil for cigarette packaging banned May 1, 1942. Permits manufacture of lead rods used in stained glass windows and, when other material impractical, making of foil for condensers, electrotyping and moulding lead, and dental X-ray equipment and supplies.

M-39: Cobalt, effective Nov. 3, 1941, amended Feb. 7, 1942. Includes cobalt in all forms. All deliveries must be authorized by Director General for Operations. Consumers file PD-581 and PD-582 by 20th of each month. **M-39-b, effective Feb. 7, 1942, prohibits cobalt use in all pigments after May 1. For other purposes quarterly consumption after April 1 cut to 35% of use first six months of 1941. Specified exceptions include government orders, orders with A-1-j or higher rating, ground coat frit for enameled steel.**

M-40: Sperm Oil, effective Oct. 16, 1941. Last amended Oct. 27, 1942.
Placed under complete allocation May 16, 1942. Banned in making lubricating or cutting oils or compounds, if sulphur content below 10%. Use of 100 lb. or less per month permitted without authorization. Sellers limited to unauthorized delivery of 2000 lb. per month.

M-41: Chlorinated Solvents, effective Oct. 15, 1941. Effects full priority control. Buyers file PD-127 with orders

M-43: Tin, effective Dec. 18, 1941; last amended Oct. 19, 1942. All shipments and uses must be authorized by Director Gen. for Oper. Distributor may deliver less than 5-ton lots to regular customers, subject to Priorities Regulation No. 1. Imports must be sold to Metals Reserve Co.
Use PD-213 to apply for allocation. Amendment, effective Jan. 14, 1942, cuts permissable amount sold without authorization by Dir. Gen for Oper. from 5 tons to 3, limits total monthly receipts from all suppliers to 5 tons. Prohibits sales, except by retailers, of solder containing more than 16% tin, any tin-bearing babbitt metal or tin oxide. Exceptions: Orders rated A-9 or higher; orders rated A-10 or higher if for equipment maintenance or repair; for making tin cans under Order M-81.

M-43-a: Tin, effective Dec. 31, 1941, last amended Nov. 24, 1942. Use in making following items banned April 1, 1942: advertising specialties, art objects; auto body solder, musical instruments, beverage dispensers, britannia metal, broom wire, buckles, buttons, chimes and bells, emblems and insignia, eyelets, fasteners, foil (except for condensers, electrotyping and moulding lead in printing trades, X-ray supplies and dental use), galvanizing, household furnishings and equipment, jewelry, kitchen equipment, novelties, souvenirs, trophies, ornaments, pewter, decorative plating and powder, refrigerator trays and shelves, seals and labels (except meat seals), slot and vending machines, pin-ball games, coated paper, oxide in enamelware as opacifier toys. Use PD-229 to appeal for exemptions. For items not specified tin use after June 30 limited to 30% of use in like 1940 quarter, giving repair parts preference. Substitutes or secondary tin must be used whenever possible. Limitation does not apply, when substitutes impracticable, provided products being made are rated A-1-k or higher (bearing metal A-3 or higher) or are tin or terne plate made under M-21-e or are certain kinds of can solder under M-81 and M-86.
Tin content of lead base alloy other than solder limited to 12%; collapsible tubes to 7¼%; terne for terne plate to 15%; long ternes to 10%. Virgin tin banned for making or treating type metal. Manufacturing jewelers prohibited Feb. 14 from processing in any way the tin in their possession; revised March 17 to permit use before May 1 of 3% of amount used in year 1941. National Lead Co. designated to purchase excess stocks of jewelers' tin-bearing metal stocks at prices fixed by WPB. Tin oxide manufacture and use banned Nov. 24, 1942. Permits manufacture of wiping solder having tin content up to 38% until Sept. 1 and limits production from Sept. 1 until Jan. 1, 1943, for installation or repair of lead water service pipes operated by a public utility. Allows manufacture of 40% solder for repair of gas meters.

M-44: Titanium Pigments, effective Dec. 1, 1941, last amended Feb. 1, 1942. Applies to distribution of titanium dioxide for use as pigment. Sets up defense pool of 25% of daily production to fill mandatory purchase orders. Remaining production is to be prorated on an equitable basis to all customers.

M-45: Sheet steel inventory for Steel Drums, effective Nov. 17, 1941, amended Dec. 31, 1941. Directs reservation by Dir. Gen for Oper. of designated quantity of hot rolled sheets in drum makers' possession or ownership, for subsequent use in making drums for overseas shipment of petroleum and other products. Also applies to sheets obtained under P-76. PD-155A is authorization to process steel. Amendment, May 25, 1942, expands allotments to include cold rolled sheets.

M-46: Chlorinated Rubber, effective Nov. 1, 1941; last amended Feb. 23, 1942. Restricts uses generally to military needs.

M-47: Burlap, effective Dec. 21, 1941, placed under complete allocation.

M-49: Iridium, effective Dec. 12, 1941. Forbids use of iridium and alloys in jewelry manufacture. PD-211 used to report monthly sales or transfer of metal.

M-50: Jewel Bearings, issued Jan. 14, 1942. Provides for complete allocation, starting March 1, 1942. Until then all sales not specifically authorized by Dir. Indus. Oper. are prohibited, except for delivery on orders of A-1-j or higher. Use PD-235, 236. Amendment Feb. 28, 1942, prohibits use of large bearings except on A-9 or better orders, unless units in place Jan. 15, 1942.

M-51: Pigs' and Hogs' Bristles, effective Dec. 13, 1941. M-51-a, effective Jan. 7, 1942, requires all persons having title to bristles to report on PD-217 to Bureau of Census by Jan. 15, 1942.

M-52: Sulphite Pulp, effective Jan. 9, 1942. Directs distribution and conserves supply.

M-53: Printing Ink, effective March 30, amended June 29, 1942. Limits use of following to 70% of 1941 rate in making printing inks: Molybdate orange, chrome green, orange mineral and organic pigments. Use of chrome pigments and iron blue limited to 100% of 1941 rate. Amendment, Aug. 13, lifts restrictions on orange mineral use.

M-54: Molasses, effective Dec. 31, 1941. Restricts monthly deliveries to various types of purchasers up to 50 per cent of monthly average receipts in 12 months ended June 30, 1941. Deliveries for foundry purposes limited to 110 per cent of base period date.

M-55: Sugar, effective Dec. 22, 1941. Use Form PD-206.

M-56: Natural Resins, effective April 16, 1942.

M-57: Tung Oil, effective Jan. 8, 1942. Sales limited to A-2 orders or better, with following exceptions: For food can linings and outside can coatings when necessary; for Defense Supplies Corp.; and to comply with safety and health regulations. Amendment, effective Nov. 1, requires specific authorization for use, except 35 lb. or less per month.

M-58: Glycerine, March 30, 1942. Deliveries of more than 50 pounds monthly placed under allocation, effective May 1, except for war orders and health supplies. Use for making anti-freeze banned, other uses limited to 70% of average 1940 rate. Users file PD-362 by 15th with suppliers and WPB. Refiners, distributors and producers report on PD-363 by 15th. Suppliers on PD-363A by 20th.

M-59: Palm Oil, effective March 20, 1942. Restricts use to manufacture of tin plate, terne plate, long ternes and steel sheets and strip; to manufacturing processes in which glycerine produced, provided remaining glycerine in product not over 1½%.

M-60: High Lauric Acid Oils, effective March 20, 1942. Prohibit use of oils which do not produce glycerine or in which amount of glycerine remaining exceeds 1½% on anhydrous soap basis.

M-61: Madagascar Flake Graphite, effective Feb. 17, 1942. Limits use to manufacture of crucibles, subject to au-

thorization by Director General for Operations. Producers request authorization monthly on PD-303A and PD-303B. Buyers seeking any article containing this material apply on PD-1A. Buyers other than jobbers file PD-575 with WPB for authority to order crucibles. Applicants for graphite to make crucibles file PD-303B.

M-62: Sodium Nitrate, effective Jan. 15, 1942. Full allocation starts Feb. 1, 1942. Producers and distributors who have not received specific directions by first of month covering deliveries may make deliveries without limitation, subject to provisions of Priorities Regulation No. 1. Use PD-238 to report receipts.

M-63: Imports of Strategic Materials, effective Dec. 28, 1941, last amended Nov. 20, 1942. Requires imports of following, whether in bond or otherwise, are to be handled only by Metals Reserve Co. or other government agency, unless authorized by the Dir. of Indus. Oper. upon submission of form PD-222A: antimony; beryllium products; chromium; columbite and columbium ore; copper; cotton linters of Chemical grades; graphite; hyanite; lead; mercury; mercury-bearing ores; rutile; silver; tungsten; tantalum ore; vanadium zinc; zirconium; various nuts and oils; commodities for civilian use; iron and steel, copper lead, tin and magnesium in scrap and alloy form. Zinc, lead and copper ore and concentrates and metallic mineral substances in crude form and not otherwise classified, are excluded. Private importers may apply on PD-222C for permission to purchase for importation. Importers file PD-222B with collector of customs.

M-65: Cadmium, effective Jan. 17, 1942 amended June 24, 1942. Deliveries prohibited unless authorized by Dir. Gen. for Oper. for essential military and civilian uses. Order M-65-a, effective Jan. 17, 1942, bans cadmium use after March 31, except for government orders, Lend-Lease and to comply with safety regulations issued under governmental authority.

M-66: Cashew Nut Shell Oil, effective Jan. 13, 1942. Use limited to defense orders rated A-2 or better for brake linings or resins required for insulating aviation ignitions or for impregnating electrical coils. Amendment, May 14, 1942, limits use for brake linings to oil from inventory, except for Army, Navy orders.

M-67: Plumbing, Heating, Electrical Supplies, effective Dec. 23, 1941. Revoked by L-63, April 6, 1942.

M-68: Material for Oil Industry, effective Dec. 23, 1941. Restricts use of materials in discovery, development and depletion of petroleum pools, including extraction plants.

M-68-2, June 20, 1942, modifies previous regulations to permit use of necessary materials to drill approximately 800 new wells in Missouri, Kansas and Oklahoma. Order restrictions do not apply to Canadian oil companies.

M-69: Distilled Spirits, issued Jan. 10, 1942. Requires all distilleries equipped to make 190 proof ethyl alcohol to make that type, starting Jan. 15, 1942. Deliveries subject to direction of Director of Industry Operations.

M-70: Jute, issued Feb. 27, 1942.

M-71: Fats and Oils, effective Dec. 29, 1941. Regulates supply and distribution.

M-72: Tin and Lead Scrap, effective Jan. 8, 1942, last amended May 18, 1942. Dealers are forbidden to accept deliveries of scrap unless during the preceding 60 days they have disposed of an amount equal to their inventory on date of delivery. Direct allocation by Director Gen. for Oper. provided, when necessary. Dealers must report by 10th of each month to Bureau of Mines on PD-249, consumers on PD-254 detailing inventory, production, purchases, sales and consumption for preceding month.

M-72-a: Sept. 2, 1942, last amended October 20, 1942. prohibits delivery to or acceptance by a producer of steel or iron of tinned scrap, including terneplate cans. Bans sales of tin plate clippings except to a broker, dealer or to a detinning plant. Tinned scrap must be sold only to brokers and dealers for resale in form received, to detinners, shredding plants, their agents, regular trash collection agencies and copper precipitation plants. Bottlers seeking permission to purchase used cans must apply to WPB on a certificate attached as Exhibit 1 to Order M-72-A. Trash collections agencies in specified districts must collect and keep segregated all prepared cans offered.

M-73: Wool, effective Jan. 3, 1942. Processing from Jan. 3, to April 4, 1942, limited to 80 per cent of basic quarterly poundage.

M-73-a: Men's and Boys' Clothing, March 2, 1942. Specifies styles for wool suits, overcoats.

M-75: Diphenylamine, effective Jan 30, 1942. Deliveries only upon instruction of Director General for Operations in schedules issued beginning of each month. Application for making deliveries filed on PD-263, application for accepting delivery on PD-262.

M-76: Turbines, effective March 9, 1942. Enables WPB to establish schedules for manufacture of land turbines.

M-77: Rapeseed Oil, March 23, 1942, last amended Oct. 6, 1942. Use prohibited after Oct. 31, 1942, except as authorized or for 35 lb. or less per month. Use up to Oct. 31 limited to making marine engine, heavy machine engine lubricating and pneumatic tool oils; factice for compounding rubber; blown rapeseed oil used in manufacture of above grades.

M-78: Mercury, effective Jan. 23, 1942. Use for following banned April 1: Carroting of hat fur; thermometers (except industrial and scientific); treating of green lumber (except Sitka spruce); turf fungicides; vermilion; wall switches for nonindustrial use; wood preservafor nonindustrial use; wood preservation. Quarterly use for following limited to 1940 period or 1941 first quarter: Fluorescent lamps; health supplies; mercuric fulminate for ammunition; industrial and scientific thermometers. Use of mercuric fulminate for commercial blasting caps limited to 125 per cent of base period.

Amendment, Aug. 5, defines redistilling as within meaning of term "processing". Use in manufacture of fireworks and film developing preparation is prohibited. Amount used in production of cosmetics cut from 80 to 30 per cent. Restrictions removed on deliveries to laboratories for specified purposes; manufacture of anti-fouling paint for merchant vessels; and maintenance and repair of industrial control equipment.

M-79: Asbestos, effective Jan. 20, 1942, amended June 18, 1942. Starting Feb. 1, 1942, processing of various grades of imported fibre prohibited, except to fill certain specified defense orders. Permission of Dir. Gen. for Oper. required to install high-temperature pipe covering, except for installations of 212 degrees Fahr. or over. Ship and underground installations exempted from latter. Processors file PD-251 or PD-252 by 10th each month.

M-80: Sole Leather, effective March 12, 1942. Set aside 80% of top grade leather soles for military shoes.

M-81: Tin Plate, Terne Plate, effective Feb. 11, 1942. Specifies products that may be packed in cans, sizes of cans to be used, amount of tin and tin plate allowed for can manufacturing. Small sizes generally eliminated. No limitation placed on can production for packing fruits and vegetables of primary importance. Those of secondary importance and important medical, chemical, dental and industrial products limited to 100% of 1940 use. Use prohibited for products not specifically listed. Use of tin plate with tin coating of 1.5 pounds per base box permitted for cans to pack certain acid-type foods. No restrictions on orders with rating higher than A-2. Delivery and use through 1942 permitted of cans of any size for primary and secondary products completely made or parts cut or in canner's possession Feb. 11. M-81-a, June 13, requires substitution of electrolytic tin plate and treated black plate for hot-dip tin plate in making cans for specified products. Amendment, June 27, bans tin and terne plate for paint cans, certain miscellaneous products, but amendment, July 9, authorizes use of such cans on hand or in process on July 1.

M-81-b, as amended Sept. 2, bans use, sale or manufacture of lubricating oil cans made of any metal. Amendment, Aug. 6, permits unlimited packing of tomato pulp or puree in small as well as large cans for remainder of the season.

Amendment, Oct. 20, bans use of tinplate in packing pyrethrum and rotenone base insecticides.

Amendment, Nov. 4, 1942, prohibits use of terne plate after Nov. 30 for packing varnish removers, liquid lacquers, lacquer thinners, lacquer stains and shellac. Amount use in 1942 is limited to 90% 1940 total. Packing of edible liquid oils in tin plate or terne plate containers of less than 5 gal. capacity banned.

M-82: Hemp Seed, effective Jan. 23, 1942.

M-83: Teak, effective March 5, 1942. Restricts use to Army and Navy.

M-84: Agave Fiber, effective Feb. 20, 1942.

M-85: Kapok, effective Feb. 4, 1942. Restricts consumption to military and a few essential civilian uses.

M-86: Canned Foods, effective March 13, 1942, last amended Oct. 26, 1942. Directs canners to set aside quantities as ordered by Director General for Operations under M-86-a. Canners must provide materials necessary to pack in export boxes canned goods set aside for armed forces.

M-89: Corundum, effective Feb. 7, 1942. Last amended Sept. 16, 1942. All deliveries allocated, including ores and superfine flour. Sellers required to file PD-293 with WPB by 10th of each month. Distributors and producers file 293A by 28th; consumers PD-294 by 10th and 294A on application for allocation of by 10th.

M-91: Cotton Duck, effective Feb. 28, 1942. Limits deliveries to fill orders rated better than A-2.

M-92: SXP Cotton Seed, Feb. 20, 1942.

M-93: Wood Pulp, effective March 12, 1942. Provides for complete allocation.

M-95: Rhodium, effective March 11, 1942. Prohibits use in jewelry plating, except for current stocks. Sellers report to WPB on PD-295, consumers on PD-296. Amendment, April 17, 1942, bans all use of rhodium in jewelry manufacture.

M-96: Agar, effective Feb. 9, 1942.

M-97: Coal and Coke, effective Feb. 13, 1942. Inventory restrictions of Priorities Regulation No. 1 revoked as they affect coal and coke, permitting inventory accumulation by consumers.

M-98: Raw Cane Sugar, effective Feb. 15, 1942.

M-99: Printing Plates, effective Oct. 1, 1942; last amended Nov. 15, 1942. Bans owners of obsolete plates from acquiring any new metal after Oct. 1. Sets up table of time limits for obsolescence. Copper engravings may be sold to authorized electrotypers. Zinc and other metal plates may be sold through customary scrap channels or to authorized smelters and refiners. Electrotypes may be sold to Essex Alloy Co. Inc., National Lead Co., Metro Smelting Co.

M-100: Rationing of Trucks, Truck-Tractors, Trailers, effective March 9, 1942. Program to be administered jointly by WPB and Office of Defense Transportation. Application forms and instructions available at truck sales agencies. Applicants approved by WPB and ODT receive Certificate of Transfer, issued by Director General for Operations, permitting purchase. Preference given military forces, police, public health and sanitation services, communication services and transportation directly connected with war effort. PD-310 is application form.

M-101: Mica, effective March 6, 1942. Prohibits processing of block mica of quality better than heavy-stained, except for government and Lend-Lease orders. Processors report to WPB on PD-325. Amendment, May 23, forbids use in any Army or Navy product not war implement. WPB authorizes uses after July 1.

M-102: Goose, Duck Feathers, Feb. 24, 1942.

M-103: Dyestuffs, March 28, 1942. Earmarks various dyes for war use and restricts civilian use of others.

M-104: Closures for Glass Containers, effective April 3, amendment May 30, 1942. Limits use of blackplate for beer and nonalcoholic beverage bottle closures to 60% of tonnage used in 1941. Bans tinplate or terneplate use in making closures for wine, distilled spirits or malt beverages. Blackplate for wine or spirits barred Aug. 1. Does not apply to scrap or reclaimed material. Tin and terne plate banned for screw bands for two-piece home-canning closures, and closures for containers of specified foods and other products.
Amendment, Sept. 29, makes black plate rejects subject to quota restrictions.

M-106: Shellac, effective April 14, 1942. Restricts use by quarters to 35% of corresponding 1941 period rate. Freezes 50% of all inventories of 10,000 lbs. or more and 50% of future imports for sale to Defense Supplies Corp. Amendment, July 31, places all shellac, except for specified uses, under complete allocation. Exceptions and special authorizations granted on appeals prior to June 24 are revoked. Phonograph record makers must apply for supplies on PD-617.

M-108: Can Enamel, effective March 23, 1942. Prohibits enamel on can ends, except to protect printing which designates contents, or to coat ends made of electro-plated sheet or untinned material. Sale of enamel for prohibited uses banned.

M-109: Rough Diamonds, March 27, 1942. Last amended Nov. 11, 1942. Sales and imports of more than 5 carats must be reported within 10 days on PD-377; smaller sales reported monthly on PD-378; quarterly reports on stocks must be made on PD-376. Does not cover cut or polished gems nor rough diamonds in a tool in use. Diamonds in unused tools must be reported. No rough diamonds not incorporated in tools and other devices can be sold or delivered unless they fill an order rated A-1-j or higher, or aggregate weight is 50 carats or less or crushing bortz or 5 carats or less of rough diamonds to one customer in one month, or WPB has specifically authorized the transfer.

M-110: Molybdenum, issued March 18, 1942, effective May 1. Covers all forms, including scrap. Provides for complete allocation. Buyers file PD-358 and 359 with WPB by 20th of month for delivery following month. PD-360 filed with WPB and supplier to request delivery. Buyers of less than 50 pounds per month do not file. **M-110-a,** Nov. 6, 1942, permits deliveries under certain conditions up to 500 lb. of contained molybdenum in any one month without applying for an allocation. Melters, other than steel product producers, may use up to 500 lb. monthly without submitting schedules to WPB.

M-112: Antimony, March 30, 1942 amended July 11, Aug. 8. Allocation applies to monthly deliveries of more than 25 lbs. of contained antimony Use in non-ceramic coatings limited to 2%, in ceramic coatings when designed to be acid-resistant. Banned for toys and decorative objects. New antimony use for auto battery alloys limited to 7% of total. Antimony content of alloys limited to 12% by weight, if no secondary antimonial lead used, otherwise 7.5%. No alloy may contain more than 0.5% antimony, or amount required by specifications. Consumers file PD-381 with suppliers and WPB by 20th of each month, also PD-380 with WPB if monthly request exceeds 448 lbs.

M-113: Canners' and Canmakers' Boxes, effective March 23, 1942. Permits accumulation of excess inventories by box users.

M-114: Goatskins, Kidskins, Cabrettas, effective March 30, 1942.

M-115: Collapsible Tin Tubes, effective April 1, 1942, last amended Oct. 22, 1942. Bans production of tubes containing more than 7½% tin, except for certain pharmaceutical preparations. Permits use of tubes containing 5% tin for tooth pastes and 1½% for shaving creams, but retail buyers must turn in used tube for each new one bought except for delivery to member of armed forces. Used tubes disposed of to Tin Salvage Institute, Newark, or other Metal Reserve Co. agents.

M-116: Closure Enamel, effective April 30, 1942. Prohibits enamel use on exterior of tin or terne plate closures for glass containers, except to protect necessary lithographed printing, or if closures sterilized for use with human food, or if closures made of electroplated tinned sheet. When used, enamel weight should be no more than nine-tenths of 1940 standard practice.

M-119: Rubber Sealed Closures, effective April 9, 1942. Beginning April 19, 1942, manufacture and sale of rubber sealed closures for glass containers used in packing certain foods prohibited. Use of such closures for packing specified products banned May 9, 1942.

M-122: Mahogany, effective May 26, 1942. Restricts use to government orders; aircraft, boats and ships; patterns and models in making products rated A-10 or higher.

M-123: Asbestos Textiles, effective March 30, 1942. Limits deliveries to makers of industrial packings, such as gaskets, pump packings, etc., and to fill orders rated A-10 or higher. Amendment, July 4, 1942, permits use to make woven friction materials without A-10 rating.

M-125: Loofa Sponges, effective April 8, 1942. Sale, delivery or use limited to orders rated A-1-a or better.

M-126: Iron and Steel Use, effective May 5, 1942; revised Nov. 23, 1942. Prohibits delivery of iron and steel and manufacture of items on List A with any type of iron and steel after 30 days and assembly after 60 days. During former period, manufacturers of products carrying Nov. 5 governing date may use, out of inventories, up to 75% of average monthly iron and steel use for such products in 1941. Prohibits delivery of stainless steel for products on List S. For 30 days ending Dec. 5, manufacturers may use out of inventory, up to 50% of average monthly use of stainless steel for such products in 1941. Use prohibited after Dec. 5, except assembly is permitted for an additional 15 days. If Army, Navy and Maritime Commission orders are not exempted, restrictive provisions relating to items carrying Nov. 5 governing date will not apply until Jan. 5, 1943. Use of stainless steels for Army, Navy, Maritime orders prohibited after Dec. 31 for List C products, unless expressly permitted. Delivery of roofing and siding in BEW and Lend-Lease orders, and for maintenance and repair of railroad freight car, street cars and busses exempted. Permits use to manufacture, repair and maintain parts for certain textile machinery, plumbing and heating equipment, and gutters and spoutings for small dwellings. Appeals filed on PD-500 with WPB field offices.

M-127: Spices, May 8, 1942.

M-128: Zinc Sulphide Pigments, effective May 5, 1942. Requires manufacturers to set aside certain percentage of production for allocation in following month.

M-129: Waste Paper, effective April 6, 1942. Permits makers of paper and paper products to accumulate waste paper inventories without restriction. Revoked June 26, 1942.

M-130: Passenger Automobiles, effective June 8, 1942. Provides for rationing cars to armed forces and government agencies.

M-131: Quinine, effective April 4, 1942 Amended April 30, 1942.

M-132: Sulfur, effective April 18, 1942. Permits receipts of sulfur in excess of practical minimum working inventory.

M-134: Tape, April 27, 1942. Assigns A-2 rating to orders for cotton fabrics used in making industrial cloth or tape.

M-136: Blackplate, effective July 22, 1942, last amended Nov. 5, 1942. Limits production of cans from blackplate to small list of essential products. Restrictions do not apply to chemically treated blackplate or to cans for use by certain governmental agencies. Prohibits packing of varnishes and drying oils in blackplate metal containers after Nov. 30, 1942. Beginning Dec. 15 oil paints, oleoresinous paints and resin-emulsion water paints must be packed in 1 gal. fiber-bodied containers with only the ends blackplate.

M-137: Benzene, effective April 20, amended June 1, 1942. Provides for complete allocation. Buyers apply on PD-223-A. Producers and distributors file PD-224-A. Use as motor fuel prohibited.

M-141: Horsehide, effective May 25. Controls disposal of horsehide leather meeting military specifications.

M-143: Indian Kyanite, effective May 6, 1942. Includes andalusite and sillimanite. Provides complete allocation. Suppliers and consumers using kyanite to make refractories file PD-466 by 10th each month with WPB.

M-144: Fuel Oil, effective May 5, 1942. Permits sales and deliveries of fuel oil without regard to previous preference ratings. Ratings may be assigned for purchases only by ocean-going vessels.

M-146: Quartz Crystals, effective May 18, 1942. Restricts use generally to telephone equipment and implements for war use.

M-147: Cashew Nuts, May 20, 1942.

M-148: Exports of Critical Material, effective May 12, 1942; last amended Oct. 1, 1942. Gives preference to exports to other American republics, within limitations of specific allocations by Requirements Committee of WPB, over orders for such materials to extent necessary to meet delivery schedules set by BEW and WPB. Exports are subject to assignment of preference ratings. Outstanding orders on Oct. 1 rerated AA-2X.

M-149: Phosphate Rock, effective May 11, 1942. Removes restrictions on inventory acquisition.

M-150: Aromatic Petroleum Solvents, effective May 25, 1942. Limits deliveries, to ratings of A-2 or better. Requires pool accumulation by producers for distribution by WPB and diversion of remaining output to production of nitration toluol or aviation gasoline. Amendment, July 11, extends restrictions to xylol.

M-152: Arsenic, effective May 22, last amended Oct. 21, 1942. Use prohibited after Nov. 1 except as specifically authorized after filing PD-600. During final quarter of 1942, deliveries may be made as allocated with buyers filing PD-490 with suppliers. Producers file PD-491 by 15th of each month.

M-153: Acrylonitrile, effective May 14, 1942.

M-154: Thermoplastics, issued June 27, 1942. Defines sequence in which orders for various purposes are to be filled. Last amended Oct. 1, extends date for scheduling operations to Nov. 1. M-154-b requires methyl methacrylate sheet scrap to be reprocessed into sheeting.

M-156: Tantalum, effective May 22. Allocates supplies monthly. Users file PD-487 and 488 by 20th, processors PD-489 by 27th.

M-157: Chemical Cotton Pulp, effective May 28.

M-158: Drum Exterior Coating, effective May 30, 1942. Restricts use of coatings containing certain organic binders or pigments for coating 2-gal. or larger containers to export use (except coatings containing tung or oiticica), or orders for armed forces or Maritime Commission. Limits colors to black.

M-160: Beryllium, effective June 1, 1942. Provides for complete allocation. PD-496 is application for and allocation of beryllium. Users file PD-497 by 20th. Latter also required of persons with 10 lbs. or more of contained beryllium in possession in any month.

M-161: Inventory Restrictions, effective June 1, 1942. Last amended Aug. 3, 1942. Lifts restrictions on stocks of materials for manufacture of refractory brick; on paper and products, waste paper and ilmenite, caustic soda and soda ash.

M-162: Platinum, effective May 30, 1942. Last amended Nov. 2, 1942. Limits sales and purchases to refiners, dealers, distributors, processors, consumers. Bans use in manufacture of jewelry. Permits completion by Jan. 1, 1943, of processing started on or before Oct. 31. Stocks must be reported by 15th each month on PD-512; sales PD-513; purchases on PD-514 by same date.

M-174: Elastic Fabrics, effective June 24, 1942. Limits use to essential health articles and military products. Permitted uses include industrial shoes, belting, flexible metallic hose, and webbing for respirators, hose masks, inhalators and goggles.

M-175: Ethyl Cellulose, effective June 18, 1942. Provides complete allocation control. Deliveries of 50 lbs. at one time in one month do not require specific authorization by WPB. Producers report monthly deliveries by 20th on PD-549, buyers file PD-550 by 15th with orders.

M-178: Butadiene, effective July 1, 1942. Provides for allocation.

M-181: Small Diamond Dies, effective July 1, 1942. Places dies having diameter of 0.0015-inch or less under complete allocation. Suppliers file PD-559, consumers PD-560 with WPB by 25th each month.

M-183: Phosphate Plasticizers, effective Aug. 1, 1942. Provides for complete allocation control. PD-558 filed with WPB by 15th each month to authorize use or delivery of more than 100 lbs. monthly. Producers file PD-557 by 25th each month.

M-184: Aniline, effective, July 13, 1942. Consumers seeking delivery of 500 lbs. or more monthly file PD-583 by 10th. Producers and distributors report monthly on PD-584 by 20th.

M-185: Pyridine, July 26.

M-187 Sunn Hemp, effective July 3, 1942. Restricts use largely to manufacture of marine Oakum.

M-191: Lithium Compounds, July 16. Placed under complete allocation. Provides for monthly requests on Form PD-585 and reports from producers on PD-586. Deliveries of 25 lbs. or less in any month are exempted from restrictions.

M-194: Cattle Hides, Calf and Kip Skins, effective July 3, 1942. Provides for allocation.

M-198: Cryolite, effective Oct. 1, 1942. Requires WPB authorization for delivery, receipt or use, except receipt and use as insecticide. Authorization requests made on PD-592.

M-199: Silver, effective Oct. 1, 1942. Bans use of foreign silver in non-essential products, except to fill A-3 or higher orders. Private users may purchase domestic silver. Production until Oct. 1 of articles on restricted lists is limited to either one-twelfth of total weight used in 1941, or one-sixth weight use in first half of 1942. Amendment, Sept. 29, extends time limit to Nov. 15, if silver had been put into process before Oct. 1.

M-200: Milk Shipping Container, effective Oct. 1, 1942. Prohibits manufacturer of milk cans except those complying with specified limitations and specifications. Use of iron and steel in year ending June 30, 1943, limited to 35 per cent of amount used in previous like period.

M-208: Softwood Lumber, effective Aug. 27, 1942, replacing L-121. Establishes control over distribution and use of all types and grades.

M-209: White Oak, effective Aug. 24, 1942.. Prohibits use in making veneer, except for war implements.

M-211: Heat Treating Equipment, effective Aug.22, 1942. Authorizes WPB to establish production and delivery schedules in such instances as may be necessary.

M-212: Petroleum Coke, effective Oct. 10, 1942; last amended Nov. 21, 1942. Limits delivery and use, subject to specific exceptions. Prohibits exports without written authorization of WPB.

M-214: Phthalic Anhydride, effective Oct. 1, 1942. Forbids any person to deliver or use this material without specific authorization of WPB.

M-215: Glycols, effective Oct. 1, 1942. Forbids any person to deliver or use glycols without specific WPB authorization.

M-219: Silica Gel, effective Oct. 1, 1942. Last amended Oct. 6. Forbids any person to deliver or use silica gel without specific WPB authorization, except 125 lb. or less to one person in one month.

M-225: Overhead Traveling Cranes, effective Sept. 8, 1942. Permits WPB to establish production and delivery schedules which shall be maintained without regard to any preference ratings already assigned or subsequently assigned.

M-227: Copper Chemicals, effective Oct. 1, 1942. Forbids any person to deliver or use copper sulphate, carbonate, chloride, oxide, nitrate and cyanide without specific authorization, except for soil treatment, insecticides and fungicides. Small orders of 450 pounds or less in any one month of copper sulphate or of 25 pounds or less of copper carbonate, chloride, oxide nitrate or cyanide are exempt under specific conditions.

M-233: Gas Cylinders, effective Sept. 30, 1942. Provides direct control by Dir. Gen. for Oper. until Jan. 1, 1943, after which specific authorization required. Producers file PD-662 on 25th of each month.

M-235: Castor Oil, effective Sept. 25, 1942. Limits use and processing. PD-600 is application for allocation.

M-238: Oiticia Oil, effective Oct. 6, 1942. Bans use after Nov. 1, 1942, except as authorized or for 35 lb. or less per month.

M-239: Steatite Talc, effective Oct. 13, 1942. Forbids use, sale, delivery for any purpose except for insulators in communications, radio, radar, and underwater sound instruments; spark plugs for certain war agencies or for delivery in accordance with L-158; filtering of foods, flavoring extracts, medicines; medicines and health supplies. Producers must file PD-678; supliers PD-679 by 10th of each month.

M-240: Vinyl Acetate, effective Oct. 8, 1942. Provide full allocation for deliveries over 25 lb.

M-242: Sulfamic Acid, effective Oct. 3, 1942. Bans use after Nov. 1, 1942, except as authorized or for 35 lb. or less per month.

M-244: Carbon Black, effective Nov. 1, 1942. Provides complete allocation.

M-255: Steel Drums, effective Nov. 16, 1942. Provides complete allocation. Prohibits sales and deliveries of new steel drums and parts (excepting flanges, plugs, cap seals) after Nov. 16 without specific authorization.

"P" ORDERS

(See P-90: Production Requirements Plan. Ratings assigned by following "P" Orders not applicable to companies required to operate under PRP, as provided by Priorities Regulation No. 11.)

P-5-b: Cranes and Hoists, effective Nov. 1, 1941. Supplemented by P-90, July 1, 1942.

P-6-a: Civil Aircraft, Repair Parts and Accessories, effective July 21, 1941, rating A-10. Rating applies to parts for repair of all registered and certificated civilian and publicly owned airplanes. Expired March 31, 1942.

P-7: Material and Equipment Entering into the Production of Merchant Ship Construction, effective June 12, 1941, ratings A-1-a (1941), A-1-b (1942), A-1-c (1943).

P-8: Material Entering into Freight Car Construction, effective June 18, 1941, rating A-3. Expired April 30, 1942.

P-9-a-b-c-d-e-f-g: Heavy Bombers, effective June 26, 30, 1941. Replaced by P-109, Feb. 20, 1942.

P-10: Material and Equipment Entering into the Conversion of Ships, effective June 19, 1941, rating AA.

P-11-a: Metalworking Equipment, effective Sept. 30, 1941, revoking P-11, P-2. Supplemented by P-90, July 1, 1942.

P-12: Aluminum Scrap, effective June 26, 1941. Repealed by M-1-d, Jan. 7, 1942.

P-13: Material Entering into the Production of **Airframes,** effective July 3, 1941. Replaced by P-109, Feb. 20, 1942.

P-14-a-b: Material and Equipment Entering into the Construction of **Ship Ways,** effective July 12, 1941, rating A-1-a (1941), A-1-b (1942-43).

P-15: Material for **Electrical Relays** and Solenoid Assemblies, effective July 11, 1941. Replaced by P-109, Feb. 20, 1942.

P-17: Canning Machinery, expired Aug. 31, 1941.

P-18-a: Cutting Tool Equipment, supplanted by PRP (P-90) July 1, 1942.

P-19-b: Defense Projects, with protected delivery dates, effective July 30, 1941. Expired Dec. 31, 1941.

P-19-c: Defense Housing, publicly financed, effective when issued, rating as assigned. Rating may be extended at any time within three months after assigned.

P-19-d: Housing Projects for defense workers, effective Sept. 9, 1941, rating as assigned. Rating may be extended at any time within three months after assigned. Expired March 31, 1942.

PD-19-e: Road Projects, effective Oct. 18, 1941, rating as assigned. Amendment, effective March 6, 1942, eliminates extension of ratings to purchase road building machinery and equipment. May be used for repair parts needed to prevent work stoppage, perishable tools, temporary work.

P-19-g: Defense Housing, by builders under FHA, effective Dec. 31, 1941. Expired July 31, 1942.

P-19-h: Rated Projects, effective when issued, rating as assigned to builders for delivery of material entering into constfuction of various projects. Amended, July 7, 1942, to cover certain "expendible materials" consumed during construction.

P-19-i: Aluminum, Magnesium Plant, rating A-1-a, A-1-b on delivery of material for plant construction.

P-20, P-21: Locomotives, effective July 21, 1941. Expired April 30, 1942.

P-24: Experimental, Research Work, effective Aug. 5, 1941. Expired March 31, 1942.

P-25, P-26 series: Tanks. Expired May 31, 1942. Ratings obtained under Production Requirements Plan.

P-29: Health Supplies Rating Plan, effective Aug. 25, 1941, rating A-10. Amendment, Feb. 14, 1942, substitutes endorsement on purchase orders for furnishing copies of P-29 to extend rating.

P-31: Foundry Equipment, effective Sept. 5, 1941. Expired May 30, 1942. Ratings obtained under Production Requirements Plan. P-31-a, June 5, makes outstanding ratings effective until deliveries completed.

P-35: Half-Track Vehicles, effective Dec. 5, 1941. Expired May 31, 1942. Ratings obtained under Production Requirements Plan.

P-37: Insecticides, germicides, fungicides, effective Dec. 31, 1941, rating A-10.

P-38: Material Entering into the Production of **Radiosondes,** effective Aug. 26, 1941, rating A-1-d. Use Forms PD-6, 6-a. Expired June 30, 1942.

P-39: Welding Machines, effective Sept. 12, 1941. Supplemented by P-90.

P-40: Industrial Lift Trucks, effective Sept. 12, 1941. After May 10, 1942, ratings must be obtained through P-90.

P-41: Material Entering into the Construction, Maintenance and Operation of **Defense Projects,** effective Aug. 27, 1941, rating A-1-a. Applies only to Pan American Airways Inc. P-41-c, June 26, 1942, assigns A-1-a rating to China National Aviation Corp. for material for war construction.

P-42-a: Canning Machinery, Equipment, repair material. Expired March 12, 1942.

P-43: Laboratory Supplies, Equipment, effective Aug. 28, 1941; revised Nov. 5, 1942. Assigns rating of AA-2X for purchase of equipment, reagent chemicals and other materials by production control and research laboratories. Specific WPB authorization required to apply rating for material costing more than $50, except reagent chemicals. Apply for authorization on PD-620. Holders of serial numbers must file PD-93 by 15th of each month. (See P-135).

P-45: Fire Apparatus, effective Oct. 31, 1941. Amended Feb. 28, 1942. Supplanted by P-90, July 1, 1942.

P-46: Utilities, effective Sept. 17, 1941; last amended Oct. 10, 1942. Assigns AA-5 rating to materials for maintenance or repair, operating supplies, or for materials required for protection against sabotage; AA-2X for emergency repairs; A-5 or better for rated projects, depending on rating assigned for the project. Limits scheduled quarterly withdrawals for distribution and transmission material by electric power producers to 15% of 1940 withdrawals, provided not less than 75% of wire, cable, buss bar is obtained from another producer's inventory by gas, water producers to 15%, provided not more than 40% (excluding meters) is obtained from another producer; by central steam heating and sanitation services to 25%. Power line extension to new consumers limited to 250 feet. Rating use for capital additions limited to $1500 for underground connections, $500 for other additions. WPB authorization required to start new additions.

P-47: Material Entering into the Maintenance and Repair of **Air Transportation Facilities,** effective Sept. 6, 1941, rating A-3. Use PD-96. Raised to AA-1, Oct. 2, 1942.

P-51: Canning Machinery and Equipment, effective Sept. 22, 1941. Expired March 18, 1942.

P-53: Textile Machinery Parts, effective Sept. 13, 1941. Supplanted by P-90, July 1, 1942.

P-54: Trucks, Trailers, Buses, effective Sept. 12, 1941. Assigns A-3 rating to materials for buses and truck trailers and medium and heavy truck bodies and cabs. Deliveries after June 30 limited to producers filing under P-90 before June 1.

P-55: Defense Housing Projects, effective when issued. Applies rating as determined by Dir. Gen. for Oper. to certain authorized materials required in connection with privately financed defense housing projects. Application for rating to be filed on Form PD-105. Amendment, March 3, 1942, provides that suppliers who process material extensively should apply for assistance under P-90 on PD-25A. Rating extended by builder or sub-contractor must be countersigned by FHA agent.

P-56: Mines, effective Sept. 22, 1941, last amended Oct. 13, 1942. Assigns ratings as follow: AA-2X to deliveries of material for maintenance and repair; A-1-a for operating supplies. WPB may assign AA-1 and AA-2X, respectively, in cases of emergency. Inventories of operating supplies in relation to production must not exceed average ratio of 1938, 1939, 1940. Operators report purchases on PD-119 to designated state agency by 10th of each month.

P-56-a: Mining Machinery and Equipment, issued Dec. 31, 1941, replacing P-23. Amended March 2, 1942. Provides for ratings—dependent on ratings of orders producer is filling—to delivery of materials for production of mining machinery and equipment, and parts thereof, of specified types. Rating may be extended by supplier. Application for assistance made on Form PD-25A, covering requirements for three months. Amendment, April 13, 1942, permits use of ratings in making deliveries to companies operating under P-58, P-68, P-73 and, with special permission, P-65-a. Amendment, June 12, limits deliveries to purchases with ratings assigned under P-56, 58, 68 or 73.

P-57: Automobile Repair Parts, effective Sept. 18, 1941. Supplanted by P-90, July 1, 1942.

P-58: Supplies for South American Mines, effective Oct. 8, 1941; last amended Oct. 17, 1942. Includes Cerro de Pasco Copper Corp., Andes Copper Mining Co., Chile Exploration Co., Braden Copper Co. Assigns AA-2X rating to 35% of operation material ordered in any six-month period; A-1-a to balance. Rating application limited to 125% of dollar value of materials received from United States in preceding calendar half year.

P-62: Laboratory Equipment, effective Nov. 15, 1941. Expired June 30, 1942.

P-65: Marine Paints, effective Dec. 5. A-3 rating assigned for raw materials.

P-68: Steel Plant Maintenance, Oct. 31, 1941. Last amended Oct. 3, 1942. Assigns AA-2X rating to operating material consisting of fabricated metal parts, lumber and all metals appearing on revised materials list of PD-25A; A-1-a to all other operating materials. Deliveries not permitted if inventories exceed 125% of dollar volume on last day of preceding calendar half-year. Quarterly withdrawals from inventory must exceed 55% of volume in preceding six months. Provides A-10 rating for supplies not directly related to actual production. PD-148 used to apply for rating. PD-228 filed monthly to report A-1-c applications.

P-72: Elevator, Escalator Repair Parts, effective Nov. 10, 1941, amended Jan. 22, 1942. Revoked Aug. 1, 1942. Supplanted by P-90.

P-73: Smelters, Refiners of Copper, Lead, Zinc, Antimony, Mercury, Cobalt, issued Dec. 22, 1941, last amended Oct. 17, 1942. Assigns AA-2X rating to material for maintenance and repair; A-1-a for operating supplies. Exemption granted from PRP. Producers must file PD-212 with WPB before applying rating. PD-248 lists purchases of materials.

P-74: Heat Treating Furnaces, effective Nov. 22, 1941.

P-75: Tackle Blocks, effective Oct. 24, 1942, rating A-1-c. File PD-82 to obtain rating.

P-76: Drum Steel Sheets, effective Nov. 17, 1941, rating A-4. Expired May 30, 1942.

P-77: Rebuilt Machine Tools, effective Nov. 10, 1941. Expired May 1, 1942.

P-78: Conveyor Machinery, effective Nov. 10, 1941. Expired Jan. 31, 1942. Priority assistance obtained under P-90 by filing PD-25 A.

P-79: Non-Metal Containers, effective Nov. 14, 1941, amended March 11, May 16, 1942. Expired June 30, 1942.

P-83: Blind-made Products, effective Nov. 29, 1941. Expired April 30, 1942.

P-84: Plumbing, Heating Repairs, effective March 13, 1942. Assigns A-10 rating to materials for emergency repairs. Does not apply to copper parts

or scarce materials for which substitutes available.

P-85: Resistance Welding Electrodes, effective Dec. 3, 1941. Assigns A-1-c rating to deliveries of materials used in making spot welding tips, resistance welding dies, seam welding wheels, water-cooled holders for tips. Use PD-82 to obtain rating.

P-86: Industrial Explosives, effective Dec. 12, 1941, rating A-8.

P-88: Railroad Material, effective March 17, amended June 17, 1942. Assigns A-1-a rating for materials needed for emergency repairs upon specific approval of WPB; A-1-j for materials essential for track, structure, signal and train and locomotive repair and operation, including perishable tools; A-8 on all other maintenance repair and operating supplies.

P-89: Chemical Plants, effective Jan. 23, 1942. Amended May 22. Assigns A-1-a rating for repairs in event of actual breakdown of plant; A-1-c for repair material up to minimum required to avert breakdown; A-3 for 70% of other material for repair, maintenance or operation, A-1-c to other 30%; A-1-c for material delivered to supplier or sub-supplier. Rating may be used only after serial number assigned by Chemicals Branch, WPB, to producer upon application. Ratio of materials inventory to current operations must not exceed average of 1938, 1939 and 1940. Amendment, March 2, 1942, redefines operating supplies, excludes materials incorporated into producer's products. Permits Canadian firms to use ratings. Amendment, June 24, 1942, removes restrictions on coal and coke inventories. Amendment, Sept. 19, 1942, assigns A-1-a rating to all metals on List No. 1 of PD-25A for fourth quarter and to fabricated parts having unit cost of $250 or less. Assigns A-1-c rating to all other maintenance, repair, operating supplies. Higher emergency ratings granted upon request. Authorization required to use ratings to buy metal containers or container materials. Ratings may be used only after filing PD-315 with WPB and receipt of serial number. Ratio of materials inventory, excluding items listed under M-97 and 161, must not exceed average of 1938, 1939 and 1940.

P-90: Production Requirements Plan, issued Dec. 3, 1941, effective first quarter of 1942. Replaces Defense Supplies Rating Plan (P-6). Ratings covering materials needed for defense or essential civilian production during that quarter assigned by Director Gen. for Oper. after applicant files Form PD-25A. One or more ratings may be assigned to cover all or any specified part of applicant's requirements. Capital items may not be obtained by rating assigned by this order. No ratings other than those authorized in PD-25A may be used by those operating under the plan.
PD-25F is application used to expedite delivery and to seek rating on additional material or higher ratings. Modified Production Requirements Plan, for manufacturers with annual sales under $100,000, uses Form PD-25-X (discontinued May 23). Amendment, March 10, 1942, permits use of ratings assigned by other certificates to obtain material not regularly carried in stock. Priorities Regulation No. 11, issued June 10, makes use of Production Requirements Plan mandatory, starting July 1, for companies using $5000 or more of basic metals quarterly.

P-91: Elevators, Escalators, Dumbwaiters, issued Dec. 30, 1941. Revoked Aug. 3, 1942.

P-92: Steel Plate and Welding Electrodes, Issued Jan. 17, 1942. Expired June 30, 1942.

P-95: Farm Machinery and Parts, effective Dec. 27, 1941, revoking P-32, P-33. Expired June 30, 1942. Revoked Sept. 1, 1942.

P-98: Petroleum Industry Materials, effective Jan. 14, 1942. Assigns following ratings to delivery of materials: A-1-c for geological search for unknown pools, A-2 for search by exploratory wells; A-2 for research laboratories seeking higher production methods; A-8 for maintenance, repair or operating supplies; A-1-a for repairs of actual breakdown, except transportation equipment which takes A-2; A-1-c to avert breakdown of producing or refining equipment; A-2 for certain chemicals and other materials used in refining; A-8 for making alterations. Permission of OPC in Washington necessary to use A-2 or higher rating, except for research or laboratory purposes. OPC field representative must sign orders with A-8 or lower rating for supplies valued at over $500. Amendment, March 15, 1942, adds office supplies and certain automotive equipment to items to which P-98 ratings may be extended. Amendment, June 19, 1942, extends similar priority assistance to Canadian petroleum operators. Amendment June 30, extends order through July 31, 1942. Amendment, Aug. 13, extends order through Sept. 15, 1942.
Supplanted by P-98-b, Sept. 15, 1942. Assigns A-1-a and A-2 ratings to all materials used in production branch, and to those used for maintenance, repair and operating supplies in other branches.
PD-98-d, effective Oct. 1, 1942, prohibits uses of any rating to delivery of materials unless assigned by PD-311 series forms.

P-100: Repairs, Maintenance, Supplies, effective Dec. 18, 1941, revoking P-22, rating A-10. Limits stocks of materials for these purposes to 110 per cent of purchases in corresponding 1940 quarter. Withdrawals from inventory similarly limited. Does not apply if purchases or withdrawals are $5000 or less per quarter. May not be used for material required for plant expansion or improvements. Plants working overtime get extra allowances. Operating supplies include ferrous parts used to make containers. Application for rating not required. Does not apply to mines. Amendment, Feb. 10, 1942, makes those using tools or equipment to repair or maintain farm machinery, and Canadian firms buying war or essential civilian materials in United States eligible for priority assistance. Amendment, Feb. 28, 1942, extends A-10 rating to boiler inspectors, etc. Amendment, March 9, 1942, assigns A-10 rating for repair and maintenance of refrigerating equipment in stores and restaurants.

P-101: Bookbinding Wire, effective Jan. 24, 1942. Assigns A-8 rating to materials for manufacture of flat steel wire used for binding processes in printing and publishing industries, excluding pre-formed staple, box stay and specialty binding wire. Used only for materials authorized by Dir. Gen. for Oper. WPB determines requirements on quarterly basis.

P-103: Gasoline Refinery (British), Dec. 29, 1941. Assigns A-1-c rating to Anglo-American Purchasing Co., New York, for operating materials.

P-106: Copper and Brass Mill Maintenance: issued Feb. 7, 1942. Provides A-1-a rating to material for repair in event of actual breakdown; A-1-c for material to make reasonable provisions to avert immediately threatened breakdown; A-3 to deliveries of other material for repair, maintenance, operation. Use of A-3 rating to obtain "other material" limited to quantities obtained in 1941. Authorization by WPB necessary to use A-1-a or A-1-c ratings. Ratio of current operations to inventory of repair, maintenance and operation material must not exceed average for 1938, 1939 and 1940. Amendment, May 14, grants A-1-c rating to suppliers to replenish inventories.

P-107: Repair Parts for Trucks, Truck Trailers, Passenger Carriers, effective Jan. 22, 1942, amended March 6. As-

P-108: Fire Protective Equipment, effective Feb. 26, 1942. Assigns A-7 rating Supplanted by PRP, June, 30, 1942.

P-109: Aircraft Products, effective Feb. 20, 1942, replacing P-3, P-4, P-9-a through P-9-g, P-13, P-15, P-52. Expired June 30, 1942. Amendment, June 17, 1942, permits suppliers not required to come under PRP to extend ratings to fill orders rated under P-109 and P-109-a after expiration of these orders.

P-110: Remodeling Projects, issued April 10, 1942. Provides A-5 rating to deliveries to builders and subcontractors of materials on Defense Housing Critical List costing not over an average of $100 per room for remodeling dwellings in Defense Housing Critical Area. Cost of scarce materials per structure limited to $800. Builders file PD-406 with local FHA office to apply for rating. Rated projects exempt from L-41.

P-115: Canning Plant Maintenance and Expansion, effective Feb. 11; last amended Oct. 27, 1942. Assigns AA-2X rating to plants canning or processing fruits, vegetables or fish for emergency repairs to avert spoilage of food in event of actual breakdown AA-3 for replacement or more efficient operation; AA-5 for normal maintenance, repair and operation. Excludes all new buildings and new production lines.

P-116: Osnaburg, effective Feb. 14, 1942, rating A-1-j to Defense Supplies Corp.

P-118: Dairy Machinery, effective April 18, 1942; last amended Nov. 12, 1942. Assigns AA-2X rating for material required for emergency maintenance or repair; AA-5 for normal repair, maintenance or operation; AA-3 for replacement of dairy or egg processing equipment. Processors must file PD-414 quarterly and to apply for use of AA-3 rating.

P-120: Aluminum, Magnesium Plants, issued March 20, 1942, last amended Oct. 6, 1942. Covers producers and basic fabricators on plant repairs, maintenance and operating supplies, applicable when specifically assigned by WPB. PD-372 used to report quarterly. Assigns rating of AA-2X to deliveries of metals on materials list No. 1 of PD-25A and to all fabricated metal parts and lumber; AA-5 to deliveries of all other material.

P-122: Aircraft, effective March 9, 1942. Raises to A-1-a or A-1-b all ratings previously assigned by preference rating certificates PD-1, PD-1A, PD-3, PD-3A or PD-5 for military and naval aircraft. A-1-a applies to tactical planes, A-1-b to trainers.

P-126: Refrigeration & Air Conditioning Machinery, issued April 20, 1942. Provides A-1-a rating for repair material in breakdown of blast furnace air conditioning equipment, A-3 for material to avert breakdown. Similar ratings provided for certain food storage and processing equipment. Expired Oct. 31, 1942.

P-129: Communications, effective April 23, 1942. Provides A-3 rating to radio or wire communication service operator for materials essential for maintenance, repair and protection of serv-

ice. Inventory limited (effective Sept. 1) to 27½% of dollar value in 1940. Amendment, Sept. 7, 1942, removes operators of wire telephone communications systems from provisions of P-179. Expired Sept. 30, 1942.

P-130: Communications, effective April 23, provides A-3 rating to materials used in normal operations and costing under $50.
Amendments, July 28, raise ratings for copper alone to A-1-j.
Amendment, Sept. 7, 1942, assigns operators A-1-a rating for material required for construction of facilities necessary to serve defense projects bearing rating A-1-c or better.

P-131: Officers Uniforms, effective June 8, 1942. Assigns A-1-i rating. After July 1, ratings for metal buttons, closures obtained under P-90.

P-132: Communications, effective Oct. 19, 1942. Assigns blanket ratings to telegraph and cable companies of A-1-a for maintenance and A-1-c for materials necessary for construction to serve defense projects.

P-133: Electronic Equipment, effective Oct. 5, 1942. Assigns A-1-j rating to materials for operating, maintenance, repair supplies for operators and suppliers, subject to specific restrictions.

P-135: Reagent Chemicals, Nov. 5, 1942. Assigns rating of AA-2X to deliveries of reagent chemicals and laboratory equipment for use by any laboratory for analytical, testing control, educational or research purposes. Rating may be applied without prior granting of a serial number as under P-43. Purchases with AA-2X rating may not exceed in any quarter buyer's average quarterly purchases in year ended Sept. 30, 1942.

P-136: Metal Scrap Processors, effective Nov. 6, 1942. Assigns following ratings: AA-2X for essential repair materials and parts to remedy breakdown or suspension of operations; AA-3 for repair materials and parts to avert breakdown; A-1-a for repair materials, spare parts and operating supplies to a total value up to $500 per quarter.

"E" ORDERS

E-1-a: Machine Tools, effective Jan. 15, 1942, revoking E-1. Contains names of contractors (urgency standing) to receive preference in tool delivery. Guides tool makers in delivery schedules when preference ratings alike. List not made public. Amendment, March 26, 1942, excludes drill chucks from types of chucks controlled by order. Prevents orders received after March 25, 1942, for any tool from being given priority in production schedules unless rating assigned by PD-1A or PD-3A or order P-19-h endorsed on order. **E-1-b,** May 1, 1942, last amended Nov. 7, 1942, apportions deliveries 75% to Service purchasers, 25% to foreign buyers and essential domestic and Canadian industries. Air Services have preference up to 75% of output of any tools. If aircraft needs are larger, 75% of production is prorated among services having aircraft orders on percentage basis. Amendment, Sept. 9, reclassifies Service groups. **E-1-c,** effective June 16, 1942, assigns A-1-a rating to orders of certain Canadian buyers.

E-2: Cutting Tools, effective July 17, 1941. (Amendment), effective July 25, 1941; superseded by **E-2-a,** effective Aug. 28, 1941; limits deliveries to orders with A-10 or higher rating.
E-2-b, Aug. 31, 1942, revoking E-2-a, requires A-9 or higher rating for sale or delivery of any of 32 types of listed tools. Orders for special tools, placed before Aug. 31, need A-10 rating for completion. Tools other than high speed steel or alloy-tipped, require A-10 or higher rating. Order specifies production and scheduling procedure for tool producers.

E-3: Machine Tools, allocation for United Kingdom, effective Jan. 12, 1941.

E-4: Second Hand Machine Tools, effective Feb. 3, 1942. Authorizes Director of Industry Operations to prohibit sale or other disposal of any second hand machine tool and to determine allocations.

E-5: Gages, Precision Measuring Tools, Testing Instruments, Chucks, June 15, 1942). Requires rating of A-10 or higher for delivery. Certain specific types costing more than $200 may be sold only pursuant to rating assigned buyer by preference rating certificate or order of P-19 series.

E-6: Hand Service Tools, effective June 12, 1942, last amended Oct. 29, 1942. Restricts sales by producers to orders rated A-9 or higher. Limits alloy steel use in making hand tools to NE 1300, 1800, 9200, 9400 and 9600 series. Other grades received by a producer prior to Nov. 1, 1942 may be used.

E-7: Metal Cutting Saw Blades, effective Aug. 31, 1942, last amended Oct. 6, 1942. Limits sales of band and hack saw blades to orders rated A-9 or hack saw blades containing no alloying elements in excess of 1.25% tungsten and 0.75% molybdenum; no thicker than 0.025-inch or longer than 12 inches.

"L" ORDERS

L-1: Motor Trucks and Trailers, effective Aug. 30, 1941. Superseded by L-1-a, effective Sept. 12, 1942. All production of medium and heavy trucks for civilian use prohibited. **L-1-g,** effective July 1; amended Nov. 19, halts production of commercial truck trailers for non-military use. Transfers busses from terms of order to L-101. **L-1-e** as amended provides for production of 500 "off-the-highway" trucks, orders for which have AA-2X rating. **L-1-h** authorizes production of 4000 heavy trucks from Aug. 1, 1942 to March 31, 1943.

L-2: Passenger Automobiles, effective Sept. 13, 1941. Production for any purpose banned, starting Feb. 1.
L-2-i, March 9, 1942, prohibits automotive companies from selling alloy steel except on orders of A-1-k or higher rating, all other steel on A-3 or higher rating. Sales must be certified to Distressed Stocks Unit, Iron & Steel Branch, WPB.

L-3: Light Motor Trucks, effective Sept. 13, 1941. Production for any purpose banned.

L-4: Repair Parts for Passenger Cars and Light Trucks, effective Sept. 18, 1941 Revoked by L-158, July 4, 1942.

L-5: Domestic Mechanical Refrigerators, effective Sept. 30, 1941. **L-5-c,** effective Feb. 23, 1942, prohibits production of complete units after April 30, 1942. Amendment March 28, 1942, permits production of kerosene refrigerators.

L-6: Domestic Laundry Equipment, (washers and ironers), effective Oct. 29, 1941. L-6-c, March 14, 1942, prohibits any production after April 14 by companies making more than 60,000 units in base period, after May 14 by others.

L-7-c Domestic Ice Refrigerators, effective Nov. 14, 1942. Revokes L-7, L-7-a, L-7-b. Limits production to quotas assigned to manufacturers. Prohibits production of any ice refrigerator after Nov. 24 containing any rubber or any metal other than iron and steel, except metal used in galvanizing, plating or coating steel; or having an iron and steel content of more than 15 lb. Prohibits production after Jan. 1, 1943, any unit having iron and steel content of more than 6 lb. or having net ice capacity of other than within 10 per cent of 50 to 75 lb.

L-8: Motor Fuel, effective Sept. 30, 1941. Regulates distribution in Atlantic coast area. Revoked Oct. 24, 1941.

L-11: Chlorine, effective Nov. 15, 1941. Restricts use in manufacture of pulp and paper board.

L-13: Metal Office Furniture, Equipment, effective Nov. 7, 1941. Supplemented by L-13-a revised, effective Aug. 5. Halts work on all orders (old or new, military or civilian) unless specific authorization is obtained from WPB.

L-16: Electric Power, effective Oct. 30, 1941. Restricts use in Southeast. Revoked Jan. 5, 1942.

L-18-b: Domestic Vacuum Cleaners, effective Nov. 26, 1942. Supersedes **L-18** and L-18-a. Prohibits production of all domestic types, regardless of ultimate use. Bans output of attachments.

L-20: Cellophane and similar Transparent Materials derived from Cellulose, effective Nov. 8, 1941, amended June 8, 1942. Bans use of material over .003-inch thick for packaging, sealing or manufacture of various products, including razor blades, textiles, hardware, metals, sporting goods, electrical equipment except manufacture thereof, pens, pencils, jewelry, clocks, canned goods, coat hangers, brake linings, paints, clay products and plastic products.

L-21: Automatic Phonographs, Weighing, Amusement and Gaming Machines, effective Dec. 10, 1941. L-21-a, March 16, 1942 prohibits production after April 30, 1942. Making spare parts for slot machines banned. Material stocks may be used to fill orders rated higher than A-2.

L-22: Warm Air Furnaces, effective April 11, 1942. Iron and steel use in 1942 by manufacturers or assemblers of 8000 or more furnaces in 1940 limited to 50% of 1940 consumption, other producers limited to 90%. Replacement parts may be made over and above quotas.

L-23: Stoves, Ranges, other domestic cooking appliances, effective Dec. 13, 1941. **L-23-c,** issued May 14, 1942, prohibits production after July 31 by manufacturers with factory sales $2,000,000 or more in year ended June 30, 1941, and by smaller makers in specified labor shortage areas. Effective May 15, small makers not in labor shortage areas permitted to make only "permitted types" and limited in iron, steel use in manufacturing stoves to 50% of base period rate, for ranges to 70%. After July 31, weight of iron and steel per stove and per coal or wood range limited to 70% of base period average. Iron, steel use to make stoves Jan. 1 to July 31 by companies required to quit production July 31 limited to six times monthly average base period rate.
Amendment, Oct. 28, bans attachment of thermostats to cooking stoves after Dec. 25, 1942. L-23-b, May 2, 1942, forbids disposal of electric ranges except on A-9 or higher ratings. Amended, July 16, to permit sale upon certificate of necessity. Prohibits production after June 1 except to fill orders rated A-1-k or higher. Replacement parts not affected.

L-26: Farm Machinery, effective Dec. 31, 1941. Revoked Nov. 1, 1942. Superseded by order L-170.

L-27: Vending Machines, effective Dec. 31, 1941. L-27-a, March 17, 1942, prohibits production after April 30, 1942. Spare part manufacture limited to rate in year ended June 30, 1941.

L-28: Incandescent & Fluorescent Lamps, effective Jan. 24, last amended Oct. 24, 1942. Bans production of Christmas tree advertising and decorative incandescent lamps. Quarterly production of incandescent and fluorescent lamp bases limited to 125% of 1940 rate on metal weight basis. Delivery of bases must be authorized by WPB on PD-532 previously filed by manufacturer by 20th of month. Plated iron and steel must be substituted for certain copper, brass, nickel and chromium parts. Brass bases for lamps for military purposes exempted. Use of nickel-clad wire for lamp leads permitted. Production of blackout lamps permitted only for military orders.

L-29: Metal Signs, March 25, 1942. Metal use in making signs of more than 36 sq. in. limited during second quarter 1942 to 12½% of use in 12 months ended June 30, 1941. All metal use banned July 1. Signs containing less than 5% of metals by weight not affected. Railroad and highway signs exempted June 2.

L-30: Household Utensils, effective March 31; last amended Aug. 24; revoked Nov. 17, 1942.

L-30-a: effective Nov. 12, restricts production of galvanized ware.

L-30-b: effective Oct. 24, 1942, restricts production of enameled ware, except for completion of articles from materials already blanked out and articles for military use.

L-30-c: effective Oct. 23, 1942. Limits production of cast iron ware to specified articles and establishes quota for each item based on percentage of iron used during year ended June 30, 1941.

L-30-d: effective Nov. 23, 1942. Prohibits use of metal in production of kitchen gadgets, cooking utensils and housewares, except as specifically provided in the order or in other orders of the L-30 series.

L-31: Natural Gas, effective Feb. 16, 1942; last amended Nov. 12, 1942. Bans gas use for structures in certain states unless heating equipment installed or specified in construction contract and main foundation completed by specified dates. Installation of gas equipment prohibited after Nov. 30 if delivery of gas for such equipment is not permitted.

L-32: Metallic License Plates, effective March 18, 1942. Prohibits state and local governments from issuing plates in one year in quantity more than 10% of weight of plates issued in corresponding year ending between June 30, 1941 and July 1, 1942, and then only to replace destroyed or lost plates, for new licenses or for "date tabs" not more than 4 square inches in size.

L-33: Portable Electric Lamps, Shades, effective March 23, 1942. Amended April 30, May 25. Limits production and metal consumption to 60% of 1940 rate. Nonferrous metal use permitted only for sockets, switches, plugs and lamp cords. Amendment, July 13, permits use of fabricated parts in stock prior to March 23.

L-35: Spare Parts for medium and heavy trucks, truck trailer, passenger carriers, effective Jan. 22, 1942. Revoked by L-158, July 4, 1942.

L-36: Umbrella Frames, Nov. 12, 1942. Limits output to 30% of 1941 total. Restricts use of steel in womens umbrellas (exclusive of tips and handles) to four lb. per dozen frames, if they have non-metallic tips and ferrules; 4.35 lb. if they have steel tips and ferrules; ribs limited to 10 of max. 20 in. length; men's umbrellas, to 5 lb. of steel per dozen frames; ribs to 8 of max. 25 in. length. Use of iron and steel for repair parts limited to 5% of total consumed by any manufacturer for frames under provisions of the order.

L-37: Musical Instruments, effective Feb. 17, 1942. L-37-a, May 29, prohibits processing critical materials starting June 1. Assembly permitted for one month (two months for pianos and organs) at rate allowed preceding three months under L-37. Permits production of instruments containing not over 10% of critical materials at rate of 75% of critical material use in 1940. Repair part production limited to 75% of 1940 rate.

L-38: Air Conditioning, Commercial Refrigeration, effective May 15, 1942. Prohibits installations of new equipment except for Army, Navy, Maritime Commission, certain other government agencies. Lend-Lease and orders rated A-9 or higher issued for specific type of equipment. Subsequent manufacturing limited to number of items delivered on preferred orders in preceding period or to number of unfilled orders. Manufacture of beverag dispensers and coolers, room coolers, soda fountains, quick-freeze refrigerators permitted for 90 days only for Army, Navy, Maritime Commission. Amendment, June 18, 1942, permits sale of certain equipment without rating to cover installation of finished product. Excludes repair parts from order provisions. Appeals for relief from order files on PD-520.

Amendment, Sept. 26, prohibits production of additional types of air conditioning and refrigeration equipment.

L-39: Fire Protective Equipment, effective Feb. 24, 1942. Includes fire extinguishers, sprinkler systems, fire hydrants and fittings, hose racks and dryers, lightning rods. Specifies products for which strategic materials may be used. Limits quarterly production of foam and anti-freeze extinguishers to quarterly average for year ended Nov. 30, 1941, except to fill government or lend-lease orders. Assembly of parts already fabricated Feb. 24 is permitted to fill defense orders with A-2 or higher rating, except 2½-in. brass fire hose couplings on hand April 27. Amendment, July 11, limits stirrup pump manufacture to orders from certain government agencies. Parts containing no nonferrous metals and at least partially fabricated July 11 may be assembled. Copper use limited to tetrachloride extinguisher pumps.

L-41: Construction, effective April 9, 1942. Bans new construction, remodeling or rehabilitation, not including maintenance or repair, with following exceptions: For specified government agencies identified with the war effort; for activities used directly in discovery, development or depletion of mineral deposits; construction subject to Order M-68; residential construction costing less than $500 or restoration from fire, damage by nature or the enemy after Dec. 31, 1941; agricultural construction costing less than $1000; construction authorized by OPM or WPB; other construction, including public works, costing less than $5000. Existing restrictions on various material uses remain in effect. When priorities assistance not required, application for on PD-200. L-41-a, May 23, 1942, stops work of $5000 or more on public amusement projects, except playgrounds and temporary structures. Amendment, July 23, provides that certain reconstruction may be started without authorization. Authorization to complete the job is required.

Amendment to L-41, Sept. 2, cuts all civilian construction further by reclassifying types, making distinctions within residential and non-residential categories, and reducing amount of construction for which no authorization is necessary.

L-41-b, Aug. 10, last amended Oct. 2, 1942. Extends to entire country limited exceptions granted to convert heating equipment to permit use of fuel other than oil, gas, electricity. Permits certain types of insulation without specific authorization, if begun prior to Jan. 1, 1943. Manufacturers under PRP should file with Plumbing and Heating Branch PD-25F, others PD-1A for iron and steel for furnace grates.

L-42: Plumbing and Heating Products, effective Feb. 11, 1942. Simplifies various items manufactured by plumbing and heating industry. Schedule 1 establishes pressure ratings for iron, brass and bronze valves. After Feb. 28 all valves produced or sold (except those in stock) must conform to standards established.

Schedule II, effective March 1, 1942, establishes sizes and standards for gray cast and malleable iron, brass and bronze pipe fittings permitted to be produced or sold. Exempts finished fittings on hand March 1, also certain types used in shipbuilding.

Amendment, Aug. 15, permits manufacture of fittings for fire sprinkler systems and drain pipes.

Schedule III, issued March 7, 1942, eliminates metal jackets, fusible plugs and tricocks from low pressure heating boilers after June 1, 1942, unless units were in stock on that date. Stops production of metal jackets March 16, 1942.

Schedule IV, effective April 1, 1942, directs discontinuance of manufacture of medium soil pipe reduction in weight of extra heavy soil pipe, elimination of use of brass pipe plugs and brass-trap screws with soil pipe fittings. Amended June 1, 1942, to confine production to type between "standard" and "medium".

Schedule V, effective April 1, 1942, lists specific plumbing fixtures which may be made of copper, copper-base alloy or die-cast zinc.

Schedule VI, April 16, 1942, establishes types and sizes for tubular radiators, eliminating production of larger units. Schedule VII, effective April 1, 1942, restricts copper and copper alloy use in hot water heaters and piping systems. Schedule V-a, effective June 15, 1942, prohibits use of copper or its alloys in making: Bath tub fillers and nozzles; shower fittings; lavatory compression faucets; lavatory combination faucets; sink compression faucets; combination sink and laundry tub faucets and spouts; laundry tray faucets; outlet plugs and strainers; tail pieces; flush ells; flush valves for closet tanks. Use permitted for certain component parts, and supply valves, effective June 15, such as valves, except for last four items.

Schedule VIII establishes specifications for low pressure thermostatic

radiator traps, float and thermostatic traps, boiler return traps, strainer Schedule IX limits sizes of gas water heater storage tanks to 20, 30 and 40-gallon sizes, effective May 15. Bans use of copper or copper alloys, eliminates metal jackets.

Schedule X, June 16, prohibits production of electric sump pumps and cellar drainers except in accordance with stated specifications. Schedule XII, June 20, bans manufacture of various bath and wash room items, other than those conforming to defined specifications covering metal use.

L-43: Motorized Fire Apparatus, effective Feb. 2, 1942. Eliminates use of fire bells, aluminum, copper, nickel, chromium, cadmium, tin, zinc, steel, synthetic rubbers, except for limited use in specific list of products. Manufacture of motorized apparatus prohibited except to fill defense orders. Sizes of fire engine pumps standardized.

L-44: Radio Receivers, Phonographs, effective Jan. 23, 1942. L-44-a, March 7, 1942, prohibits production after April 22, 1942. Use of more than $500 worth of materials, other than wooden cabinets, ordered after Feb. 11, 1942, banned. Replacement parts not affected.

L-46: Electric Power, effective Feb. 27, 1942. Provides for integration of generating systems by utilities and industries and curtailment of consumption of Niagara frontier area in event of power shortage.

L-48: Light Aircraft, effective Feb. 17, 1942. Covers new planes built after Sept. 30, 1941, flown less than 100 hours and using engines of less than 500 horsepower. Sales, other than to government agencies and Allied nations, prohibited, unless approved by Director General for Operations. After Sept. 1, 1942, manufacture limited to planes with airframe content of 12% aluminum, regardless of rib material.

L-49: Beds, Springs, Mattresses, effective March 20, 1942, with subsequent amendments. Completely revised Aug. 4. Prohibits use of iron and steel in production of mattresses after Sept. 1 and of lounges after Nov. 1. Establishes quotas for production of bed springs and sets up regulations governing the renovation of mattresses, springs, lounges and other products.

L-50: Telephone Industry, effective March 2, 1942. Limits changes in equipment and facilities of telephone companies. Bans conversion of manual offices, replacement of existing instruments of users unless beyond repair, installation of extension phones in residences.

L-51: Anti-Freeze, effective May 14, 1942. Places production on quota basis.

L-52: Bicycles and Parts, effective March 12, amended July 16, 1942. Bans production of juvenile models after April 1. No models may weigh more than 31 pounds. Output April 1 to June 30 limited to 42% of 1941 average monthly rate, July and August production to 32%. Metals used in manufacture limited generally to iron, unalloyed steel, silver and gold. L-52-a, effective April 2, 1942, prohibits sales of new adult bicycles, pending start of rationing.

Amendment, Sept. 2, limits output to 10,000 victory models a month, of which Westfield Mfg. Co. may produce 6000 and Huffman Mfg., 4000.

L-53: Track-laying Tractors, effective Feb. 19, 1942. Includes bulldozers, power control units, winches, etc. Prohibits producers and distributors from selling unused tractors or equipment, except against orders received prior to Feb. 19 and carrying rating higher than A-2, L-53-a, April 9, 1942, bans production of 17-35 horsepower tractors Sept. 1. Meanwhile Allis-Chalmers and Caterpillar may build 1000 each, International Harvester 600, Cleveland Tractor 435. Amendment, June 15, prohibits sale, lease or delivery except on specific release issued before June 15. L-53-b restricts repair parts production in year ending June 20, 1943, to 50% of value of tractor and parts output in 1941; sales limited to 40% of 1941 output.

L-54: Typewriters, effective March 6, 1942. Prohibits delivery of new and used units, except for repairs, pending OPA rationing. L-54-a, March 17, amended May 30, and Aug. 4, 1942, prohibits manufacture after Oct. 31, except by Woodstock Typewriter Co. Portable typewriter output ceased July 31. Manufacture by major companies between July 1 and Oct. 31 limited to 12.25% of total nonportable typewriters billed to customers in 1941. Woodstock may produce not more than 1600 per month. All new typewriters are reserved for the Army, Navy and Maritime Commission. Sets quotas of parts for export on same percentage basis as for production of new typewriters.

L-54-b: Office Machinery, March 15, 1942. L-54-c June 1, revoking L-54-b, restricts production through remainder of year to permit stockpile accumulation to accommodate needs of essential users until June 30, 1944. Production quotas fixed for each type machine. Also regulates distribution.

L-55: Shotguns, effective Feb. 23, 1942. Prohibits delivery of 12-gauge guns except to agencies and officers of federal, state and local governments and for lend-lease. Limits shotgun production in other than 12-gauge size to one-half average 1940 rate. Prohibits use of machinery suitable for making 12-gauge guns in turning out shotguns of other sizes.

L-56: Fuel Oil, effective March 14, 1942, amended July 11. Limits deliveries in eastern area to former consumers.

Amendment, Sept. 15, prohibits deliveries after Oct. 1 except in accordance with OPA rationing regulation.

L-57: Gas Masks and Anti-Gas Devices, effective March 3, 1942. Prohibits manufacture or sale of such items for protection against enemy attack, unless ordered by government agency and built to Army Chemical Warfare Service specifications.

L-58: Sextants, effective March 11, 1942. Prohibits sales except to government agencies, to buyers who have obtained a certificate from the Coast Guard, and to dealers. Imports from Great Britain prohibited unless approved by Lend-Lease Administration.

L-59: Metal Plastering Bases, effective March 25, amended July 11, 1942. During four months beginning July 1, iron and steel use by producers who used 14,000 tons or more of metals in 1941 limited to 10% of average 1940-41 use, zinc to 25%. Smaller producers limited to 50% for iron and steel, 35% for zinc. Covers accessories as well as lath, etc.

L-59-b: prohibits manufacture after Nov. 15, 1942, except for government agencies.

L-60: Pistols, Rifles, Shotguns, effective Feb. 27, 1942. Prohibits disposition of new guns, except sales to federal, state, local and Allied governments and for Lend-Lease. Certain types released May 26.

L-61: Rubber Machinery, effective March 11, 1942, last amended Oct. 10, 1942. Restricts production, sale and delivery of equipment used to retread or recap tires to orders rated A-9 or higher on PD-1A, PD-1X or PD-408 certificates.

L-62: Metal Household Furniture, effective March 20, 1942. Covers items with more than 5% metal content by weight (other than nails, other joining hardware). All production banned after May 31. Amendment, May 14, 1942, permits until June 30 assembly of parts so processed as to be worthless for other purposes. Amendment, July 11, permits Venetian blind die casting stocks fabricated before March 20, 1942, and containing not over 2% aluminum to be assembled until Sept. 1, 1942.

L-63: Suppliers' Inventories, effective April 6, 1942, revoking M-67. Subsequently amended and reissued Aug. 13, 1942. Covers wholesalers, distributors, jobbers, dealers and retailers furnishing automotive, aviation, builders' construction, dairy, electrical, farm, foundry, grain elevator, hardware, industrial, plumbing and heating, refrigeration, restaurant, textile mill, transmission or welding and cutting supplies from stock. Limits inventories in eastern and central time zones to twice sales from stock in second preceding month or to two-thirds sales in preceding three months; in other zones to three times sales in second preceding month or to total sales in preceding three months. Suppliers must record inventories and sales on PD-336 for WPB inspection. Seasonal lines may be stocked at previous years rate. Exempted are suppliers with total inventory of less than $20,000 or with stocks of each type of supplies of less than $10,000. "Supplies" do not mean steel warehouse products, materials made of aluminum, auto and truck replacement parts, functional replacement parts for machinery and equipment, machinery or equipment costing more than $5000 per unit, material rationed by OPA, non-critical building materials.

L-64: Burial Equipment, March 28, amended Sept. 24, 1942. Limits use of iron and steel from Sept. 24 to Dec. 23 in joining hardware to 6 lb. per casket and to 4 lb. if casket contains handle hardware assemblies fabricated prior to March 28. Weight of joining hardware limited to 4 lb. per casket after Dec. 23. Bans use of iron and steel in handle hardware Sept. 24, except fabricated assemblies in inventory prior to that date. Restricts amount of iron and steel in each liner to 50 lb., not exceeding 26 standard gage thickness, except thicker material in inventory prior to March 28. Permits use of lead in liners for gaskets and for soldering. Limits use of iron or steel in joining hardware for shipping cases or burial vaults to 2 lb. per unit and for handle hardware to 3¼ lb. per unit for shipping cases. Bronze or other metallic finishing materials in inventory on March 28 may be used.

L-64-a, effective Oct. 2, 1942. Bans sale by manufacturers of caskets of specified measurement, containing more than 25% of iron and steel by weight, except for authorized uses.

L-65: Domestic Electrical Appliances, March 30, 1942. Production after May 31 limited to orders rated A-2 or better. Nickel not permitted for plating after March 31, 1942. Making of replacement parts not restricted. Use of electrical

resistance material limited to parts in stock and to 15% of 1941 consumption.

L-67: Lawn Mowers, effective March 30, 1942. Bans production after June 30, 1942. Amendment, Aug. 1, permits resumption of gang mower production for the Army, Navy, Maritime Commission and Lend-Lease at the same rate as existed during the April 1-June 30, 1942 period.

L-68: Garment Closures, Associated Items, effective April 1, 1942. Limits use of steel, zinc or zinc alloy in making slide fasteners or parts to 50% of rate for year ended June 30, 1941. Bans use of copper or copper alloy and restricts length of slide fasteners to 10 inches, except for trousers (may be 12 inches) and work jackets (may be 20 inches). Prohibits manufacture or delivery of slide fasteners made of steel, zinc, copper or their alloys for use on any of 32 specified articles. Bans copper use in making hooks, eyes, snap fasteners, buttons and other types of closures and restricts use of steel and zinc except in filling government orders.

L-69: Bright Work on Vehicles, effective March 14, 1942. Prohibits use of bright work on all types of motor vehicles and trailers, including replacement parts and accessories other than ventilator window latches, external locks, cylinder caps and covers, windshield wipers and body trim screws.

L-71: Flashlights, effective April 1, last amended Oct. 3, 1942. Bans use of aluminum, crude rubber, chromium, cadium, nickel, tin, copper, zinc, iron or steel in making dry cell batteries or cases with certain exceptions. Cuts production and places deliveries under strict control.

L-72: Razors and Blades, effective March 1942; last amended Nov. 3, 1942. Safety razor production banned except for armed forces, export Lend-Lease. Copper consumption in making safety razors restricted to plating only, not over .0004-inch thick. Straight razor output limited from Nov. 3 to Jan. 1, 1943, to 8⅓% of 1940 total; completely banned after Jan. 1, 1943. Razor blade production for civilians limited quarterly to the greater of these amounts: 21% 1940 output; 15⅓% 1941 output. Use of low carbon steel backing in single-edged blade limited to 0.018-inch thickness. Blade sales limited to 18% for military services, Lend-Lease and export; 84% for civilians. Manufacturers must file PD-655 by 10th of each month.

L-73: Metal Office Supplies, March 28, 1942. Except for wire staples, iron and steel use cut 20% to 50% from rate in 1940. Use of any copper, tin, nickel, chromium, cadmium or crude rubber prohibited unless processing started. Zinc use limited to galvanizing necessary for practicable use. Manufacturers must follow federal specifications issued by Director of Procurement.

L-74: Oil Burners, effective April 15, 1942. Production of burners capable of using more than 15 gallons of oil per hour limited to orders rated A-10 or better. Output of smaller burners in April and May limited to one-twelfth 1941 production, banned completely after May 31. Amendment, June 4, excepts burners used on shipboard, or for cooking or heat treating, sold on orders rated A-10 or higher.

L-75: Coal Stokers, effective April 15, 1942, last amended Oct. 20, 1942. Restricts sales of stokers capable of feeding more than 60 pounds of coal per hour unless authorized on PD-668. Output of smaller stokers banned. Replacement parts may be made. Manufacturers must file production and delivery schedules with WPB by Nov. 4.

L-77: Metal Windows, effective March 25, 1942. Restricts production of metal window framework to orders with rating better than A-2, unless manufacture started before March 25. Sales limited to orders with A-10 or better rating. Amendment, April 28, 1942, permits manufacture of basement and residential casement windows made of materials in stock prior to March 25 for use in rated housing projects. Material deliveries must be made under P-90.

L-78: Fluorescent Lighting Fixtures, effective April 2, 1942, last amended Oct. 21, 1942. Prohibits manufacture or assembly of fixtures or parts except from material acquired on PD-25A or A-2 preference rating and in makers possession April 20 through orders placed before April 3.

Use of metals in manufacture of reflectors banned beginning Oct. 31.

L-79: Plumbing, Heating Equipment, effective April 16, amended May 23, 1942. Permits shipment until June 30 of equipment against orders received no later than April 16. Permits delivery of equipment until July 31 for completion of projects started between Aug. 1, 1941 through April 9, 1942; equipment on A-10 or better rating; items costing no more than $5 if part of an order totaling no more than $10; oil burning furnaces replacing other similar equipment and installed for the purpose of reducing fuel oil consumption; cooking and heating stoves and water heaters if no other equipment for these purposes available.

Amendment, Aug. 11, extends order to cover additional types of heating, cooling and baking equipment.

L-80: Outboard Motors, March 27, 1942. Halts production except for specified government agencies. Spare parts output limited to 75% of 1941 rate. Manufacturers' stocks of motors of 6 horsepower and more frozen for disposal to government.

L-81: Toys and Games, effective April 1, 1942; last amended Nov. 24, 1942. Prohibits manufacture or assembly of toys, games (including parts) containing cork, silk, urea plastics, antimony phenolic plastics, tin, zinc, rubber, silver, iron and steel. Use of joining hardware is limited to average 1941 use.

L-82: Construction Equipment, effective May 2, 1942; revoked Nov. 30, 1942.
L-82-a, May 2; revoked Nov. 30, 1942.

L-83: Industrial Machinery, effective May 15, 1942. Prohibits filling orders for certain types of new or used machinery, except for specified government agencies, United Nations, Lend-Lease or on A-9 or higher rating issued on original PD-1A, P-19-h, PD-25A or PD-408 certificates or on PD-3A certificates countersigned before April 9. Exempts certain orders involving less than $200 and parts worth less than $1000. Parts costing more than $1000 not restricted in event of actual breakdown of machinery. Amendment, May 18, 1942, extends restrictions to additional machinery, permits production for stock without authorization.

Amendment, June 30, 1942, extends restrictions to new woodworking sawmill and logging machinery costing more than $250.

L-84: Electric Heating Pads, effective April 4, 1942. Limits 1942 production to 50% of 1940 output, hospital type to 100%. Permits rubber use in pad only in latter type. Prohibits use of chromium and resistance material containing more than 50% nickel. Limits use of resistance material per unit to 1940 rate. Amendment April 15, 1942, bans all production after June 30, 1942, except to consume processed material in stock April 4.

L-86: Liquefied Petroleum Gas Equipment, effective April 8, 1942. Prohibits installations with following exceptions: Material for maintenance or repair of existing equipment; installations started prior to Jan. 14, 1942, and completed by May 15, 1942; installations in use prior to April 1, 1942, and subsequently withdrawn from use; containers exchanged in normal course of distribution; installations authorized by WPB, Application for such authority made on PD-397.

L-88: Used Rails and Joints, effective April 22, 1942. Prohibits disposition of used rails (35-132 lbs.) unless authorized by Director General for Operations. New rails may be received only to extent of used rail footage made available for use as ordered by the Director in following amounts: 15% within 30 days of new replacement rail receipt; 15% additional in 60 days; 20% additional in 90 days; 40% in 150 days. Amendment, May 18, permits disposal without authorization of not over 10 tons of rails monthly.

L-89: Elevators, effective July 9, 1942. Requires WPB authorization for manufacturers to fill orders for elevators equipped with other than manually operated doors or gates; also orders for revised control or other parts and accessoriees. Authorization applied for by purchasers on PD-41. Cork use on platforms or as wainscot prohibited Sept. 10.

L-91: Laundry Equipment (commercial), effective April 18, 1942. Bans manufacture after June 1 and of dry cleaning equipment after July 1, except for Army, Navy, Maritime Commission orders. Freezes existing equipment and stocks acquired prior to deadlines. Amendment, June 3, permits assembly of completely fabricated parts after deadlines, if delivery approved by WPB.

Amendment, Aug. 28, imposes same restrictions on used equipment valued over $100. Authorization for delivery obtained on PD-418.

L-92: Fishing Tackle, effective April 23, 1942; last amended Nov. 18, 1942. Prohibits use of metals, plastics and cork in making non-commercial tackle after May 31, 1942, except fish hooks, which may be made quarterly at 12½% of 1941 total. Prohibits use for repairing such tackle or for production of repair parts after Nov. 18, except parts fully fabricated or in process on that date.

L-93: Golf Clubs, effective April 9, 1942, last amended Oct. 12, 1942. Prohibits use of iron, steel, other critical metals, plastics and cork in making golf clubs. Use of other critical metals, plastics, cork banned April 9. Assembly of parts fabricated before April 9 permitted until June 30. Use of critical materials prohibited for manufacture of repair and replacement parts, except completely fabricated parts in manufacturers' stocks on Oct. 12.

L-97: Railroad Locomotives, effective

April 4, 1942. Freezes finished units in producers' hands and prohibits production except in accordance with schedules issued by WPB, L-97-a, April 4, applies same regulations to railroad cars. L-97-a-1, April 29, amended Nov., 1942, cancels all A-2 or lower ratings assigned prior to April 29 (including those on material for freight car construction). Builders may sell any material to other builders or to railroads. L-97-a, amendment effective May 28 on freight cars permits sale of equipment used to build or repair cars between producers or suppliers of materials, regardless of restrictions under M-21 on iron and steel deliveries. L-97-b, Aug. 8, requires WPB authorization for production or delivery of railroad-type industrial cars.

L-98: Domestic Sewing Machines, effective April 25, 1942. Bans production after June 15, 1942. Output meanwhile restricted to 75% of 1940 rate. Repair parts manufacture during 8 months after May 1 permitted to use iron and steel at 125% of average 1940-41 rate, nonferrous metals at 100%.

L-100: Compressors, effective April 17, 1942. All new, used and reconditioned heavy compressors placed under allocation. Manufacturers prohibited from accepting orders unless authorized on thority to place order, PD-416 application for permission to make delivery.

L-101: Passenger Carriers, effective May 21, 1942. Prohibits production or delivery of new trolley cars and commercial motor busses except in accordance with specific instructions issued by WPB.

L-102: Used Generators and Steam Boilers, effective April 11, 1942. Prohibits sale, lease or option of used electric generating equipment or used steam boilers without authorization from Director General for Operations, unless value is less than $1000.

L-104: Metal Hairpins and Bob Pins, effective April 25, 1942. Amended Aug. 8. They may be sold only in packages containing less than 100 pins. Length restricted to two inches or smaller. Amendment Sept. 25 permits production at 25% of 1941 rate. Inventory of raw materials restricted to 30-day requirements.

L-105: Helmets, effective April 29, 1942. Bans production and sale of helmets for civilian use during air raids, except on order by government agency or other United Nation. Amendment, June 5, permits assembly and sale of helmets in process or completed April 29.

L-106: Copper Use in Motor Vehicles, effective May 5, 1942. Prohibits use of copper or copper alloys in making all but essential operating parts.

L-107: Extended-Surface Heating Equipment, effective June 13, 1942. Includes unit heaters, unit ventilators, blast heating coils, convectors and winter air conditioners. Prohibits delivery, except to Army, Navy, Maritime Commission or Coast Guard, unless authorized on PD-412A by WPB. Suppliers file PD-467 15th each month to report preceding month's deliveries.

L-108: Finishes of Metalworking Equipment, effective April 27, 1942. Finishes applied after April 30 limited to one coat of primer or sealer; no filler; two coats of paint, enamel or lacquer of "old machine-tool gray."

L-110: Electroplating and Anodizing Equipment, effective May 11, 1942. Limits sales to A-1-j or higher ratings.

L-111: Hand Trucks, effective May 7, 1942. Prohibits manufacture of rubber-tired trucks, except for sale to certain industries.

L-112: Industrial Power Trucks, effective July 10, 1942. Prohibits manufacturers from accepting orders unless rated A-9 or higher on PD-1A or PD-3A certificate. Deliveries limited to orders placed before July 10 and rated A-1-k or higher or to orders placed after July 10 rated A-9 or higher on PD-1A or PD-3A. Production limited after Aug. 15 to "approved standard models" as defined by WPB. Limits use of specified critical materials.

L-113: Pencils, effective May 2, 1942. Bans use of all metals except iron or steel in manufacturer's inventory in making wood-cased pencils. Finishing material use limited to 1 gallon per 100 gross of pencils.

L-114: Safety Equipment, effective May 5, 1942. Use of scarce material banned, except on orders rated A-2 or higher if made from parts manufactured prior to May 5, or for certain specified parts, or for delivery to Army, Navy, Maritime Commission under specified conditions.

L-117: Heavy Power & Steam Equipment: effective May 18, 1942. Last amended Nov. 4, 1942. Limits sales and deliveries to government and Lend-Lease orders, orders rated A-9 or higher assigned by PD-3A countersigned prior to May 18, or by PD-1A. Affects other than marine units. Amendment, June 8, permits deliveries on A-9 or higher ratings assigned by PD-4X or PD-25A. Manufacturers must file PD-665 with WPB by 15th of each month, listing unfilled orders at end of preceding months and production schedules.

L-121: Construction Lumber, effective May 13, amended July 10, 1942. Prohibits sales and deliveries by large producers to Aug. 27, except to Army, Navy, Maritime Commission. Replaced by M-208, Aug. 27, 1942.

L-123: Industrial Equipment, effective May 26, 1942, amended Aug. 27. Limits sales to A-1-c or higher ratings (A-9 if delivered before Oct. 1 on orders placed before Aug. 27). Exempts single repair parts if valued at less than $1000.

L-126: Refrigeration & Air Conditioning Machinery, effective July 3, 1942. Provides for specifications and restrictions for production of such equipment. Schedule I specifies permitted types and sizes of drinking water coolers. Schedule II covers refrigeration condensing units.

Schedule III, effective Sept. 2, 1942, limits use of nonferrous metals, weight of ferrous metals and percentage of materials which may be used as a coating or bonding material in manufacture of coil or tube assemblies.

L-128: Automotive Exhaust Valves, effective July 1, 1942. Permits use of chromium and nickel only in valve head. Prohibits sale unless consumer turns in used valve which cannot be reconditioned. Valves made under specifications for medium and heavy trucks may not be used in passenger cars or light trucks. Does not apply to Army, Navy or Maritime Commission orders.

L-131: Officers' Military Insignia, effective July 20, 1942. Limits use of copper in "gold color" insignia and prohibits use of aluminum, cork, nickel and nickel silver, rubber, tin, cadmium, rhodium and chromium in making officers' military insignia.

L-131-a, Aug. 28, 1942, permits sales by persons certified by Adjustant General, War department.

L-134: Instruments, Valves and Regulators, effective May 26, 1942, amended Sept. 9. Establishes specifications for 28 specific items forming component parts of industrial processing instruments, valves and regulators. Limits use of instruments containing chromium and nickel to certain operating conditions. Prohibits deliveries against orders rated below A-1-c, repair parts below A-8, except for orders from specified government agencies. Restricts manufacturing and deliveries in accordance with specified uses. Exempts instruments containing no nickel or chromium, or instruments made before May 26.

L-135: Wood Upholstered Furniture, Aug. 8, 1942. Prohibits production of furniture containing iron or steel other than joining hardware, Nov. 1.

L-136: Church Goods, effective June 23, 1942. Bans production or assembly of church goods containing specified critical materials. Starting June 1, iron and steel use limited to 50% of amount of iron, steel and critical material used in corresponding 1940 period.

L-139: Dental Equipment, effective June 25, 1942. Schedule I reduces by about 50% types and sizes of dental excavating burrs permitted to be manufactured

L-140: Cutlery, effective June 1, 1942. Iron and steel use limited to following percentages of rate for year ended June 30, 1941: 100% in making industrial food processing instruments; 60% for cutlery used in homes, shops, hotels, etc., to prepare food; 35% for cutlery used in serving and eating food, and ordinary scissors; 100% for unessential cutlery until June 30, nothing thereafter.

Amendment, Aug. 25, lifts restrictions on orders placed by War Shipping Administration and military orders placed by jobbers, wholesalers and other dealers.

L-142: Metal Doors, effective Sept. 16, 1942. Phohibits production of metal doors, frames and shutters, except A-10 repair orders and fire doors meeting certain specifications and airplane hangar doors. Permits orders on hand to be filled if completed in 45 days or intended for rated project already under way.

L-143: Tire Making Machinery, effective July 4, 1942. Prohibits production and delivery of such machinery after July 19 unless authorized by WPB.

L-144: Laboratory Equipment, effective June 12, 1942. Prohibits sale or delivery of equipment containing critical material except for certified essential uses.

L-145: Aircraft Bearings, effective June trol and pulley bearings to certain 9, 1942. Restricts production of conspecified makers.

L-146: Welding Rods, Electrodes, effective June 13. Restricts deliveries, other than to Army, Navy, specified government agencies, Lend-Lease and accredited schools, to orders rated A-9 or higher. Alloy electrodes and rods require A-1-j or higher rating. Use by schools limited. Producers may deliver for repair and maintenance use no more than 6%

of total in preceding month. Stocks of users limited to 60-day supply.

L-147: Machine Tools, effective July 10, 1942. Prohibits production of tools calling for special electrical specifications after July 15.

L-148: Wire Communication Equipment, effective Sept. 7, 1942. Limits nonessential production of wire telephone, telegraph equipment. Prohibits manufacturers, distributors and dealers from accepting any order for purchase or use of equipment rated below A-7.

L-150: Douglas Fir Plywood, effective July 1, 1942. Prohibits production or delivery after July 1 of types and sizes other than those listed in order.

L-151: Watthear Meters, July 31, 1942. Prohibits production of household electric meters after Sept. 26, 1942. Curtails output in the interim to 2.5 per cent of total number made during entire calendar year 1941. No deliveries allowed unless they are: for use of Army, Navy, Maritime Commission, or War Shipping Administration; delivered under a preference rating assigned by order P-46 as amended; and delivery of repair and maintenance parts not affected. Mfgrs. must file with WPB a report by Aug. 15 and on 10th of each succeeding month showing inventories, deliveries, and unfilled orders.

L-152: Baby Carriages, effective June 13, 1942. Confines metal use by manufacturers to iron, steel, gold, silver. Iron and steel use per carriage restricted until Nov. 1 to 6 lbs., not including joining hardware; to 6 lbs., including hardware, after Nov. 1. Iron and steel use per stroller restricted Aug. 1 until Nov. 1 to 3 lbs., not including hardware; to 3 lbs., in- and steel use per baby walker restricted to hardware, starting Aug. 1. Production of carriages and strollers after July 31 limited to rate during cluding hardware, after Nov. 1. Iron year ended June 30, 1941.

L-154: Power, Steam and Water Auxiliary Equipment, effective June 17, 1942. Last amended Nov. 21. Schedule I bans use of stainless steel or nickel alloys in manufacture of water meters. Copper and its alloys eliminated from all parts except internal gears and workings. Tin use prohibited except as alloy in copper. Permits use up to 60% of materials and parts on hand July 1 but output cannot exceed 12½% of shipments during year ended May 31, 1942. Schedule II, Aug. 19, prohibits copper, nickel and tin use in steam surface condenser tubing to be made of admiralty or muntz metal. Schedule III prohiits use of copper, copper-ase alloys, or alloys containing nickel, chrome or tin in tubing or tube sheets for feed water heaters. Materials needed for repair of an actual breakdown which involves replacement of not more than 25% of the tubing in a heater is excepted from the order.

L-157: Hand Tool Simplification, effective July 20, 1942, last amended Oct. 16, 1942. Authorizes issuance of schedules specifying types, sizes and specifications of various tools permitted to be manufactured. Schedule I, issued July 20, covers hand shovels, spades and scoops.

Schedules II and III, Sept. 17, cover axes, saws, hatchets, adzes, light hammers. Schedule IV, Oct. 3, covers heavy forged hand tools.

L-158: Automotive Replacement Parts, effective July 4, 1942. Supersedes L-4, L-4-c and L-35. Permits parts production in third and fourth quarters up to following limits: For passenger cars and light trucks, up to 70% of sales in 1941 period if inventory not in excess of four-month supply, otherwise up to 50% provided inventory not increased during quarter; for medium and heavy trucks, trailers, busses and off-the-highway vehicles,up to 125% or 75% under same limitations as for passenger cars and light trucks. New part may not be sold if replaced one can be reconditioned. Amendment, Aug. 3, authorizes producers to schedule production of essential replacement parts ahead of all other orders rated lower than A-1-a. Consumers not required to turn in old parts in exchange for new unless the part is installed by producer or distributor.

Amendment, Sept. 1, 1942, permits manufacturers to schedule production as if order received had a rating of AA-2X.

L-159: Plastics Molding Machinery, effective July 4, 1942. Restricts production and delivery to orders from certain government agencies, United Nations; or to those rated A-9 or higher on PD-3A certificate countersigned prior to July 4, or by order in P-19 series issued before July 4; or by PD-1A or P-19-h issued at any time.

L-161: Electric Fuses, effective Sept. 9, 1942. Prohibits use of copper or its alloys to make fuses, other than current carrying parts. Bans assembly of fuses containing copper other than current carrying parts, effective Sept. 24. Restricts manufacturers' sales to other manufacturers or to orders rated A-10 or higher, effective Sept. 9.

L-163: Turbo-Blowers, effective Aug. 7, 1942. Requires authorization on PD-616A for purchasing blowers covered by order definitions. Application for authorization to place orders must be made on PD-616.

Amended Oct. 1 to include blowers with capacity of 5000 cu. ft. per min. or more.

L-168: Blackout and Dimout Lighting Fixtures, effective Sept. 18, 1942. Prohibits manufacture or sale of such fixtures not conforming to specifications of War and Navy Departments and Maritime Commission. Provides conditions under which approved fixtures may be sold, and restricts metal use in their manufacture.

L-170: Farm Machinery, effective Oct. 21, 1942. Restricts manufacture for the year ending Oct. 31, 1943, to 20% for new machinery and 130% for repair parts, based on 1940 or 1941 total whichever was higher.

L-170-a, Nov. 7, 1942, bans use of copper and copper base alloy products in manufacture of farm tractors, engine power units, or repair parts other than for specified purposes.

L-172: Heat Exchangers, effective Aug. 5, 1942. Last amended Nov. 2, 1942. Provides for complete allocation. Requires authority on PD-615A to place or accept orders. Application for authorization to place orders must be made on PD-615. Army, Navy and Maritime Commission and War Shipping Administration exempt from terms of order for 30 days.

Restrictions on surface condensers covered in M-117.

L-173: Space Heaters, effective Aug. 5. Prohibits production of space heaters calling for use of fuel oil or gas, except to fill military orders. Replacement parts may be made.

Amended Sept. 19 to exempt gas units.

L-174: Manufactured Gas, effective Aug. 25, 1942; last amended Nov. 12, 1942. Provides for adequate deliveries to war and essential industries. Limits civilian use to existing consumers. Prohibits installations of gas equipment if gas delivery for such equipment is not permitted.

L-175: Watches, effective Aug. 7, 1942. Prohibits sale of railroad standard watches by manufacturers except to fill orders for Army or for time service employes of railroads.

L-176: Portable Electric Fans, effective Sept. 7, 1942. Freezes stocks in hands of manufacturers. Application for release must be made to WPB on PD-556.

L-178: Film, effective Aug. 20, 1942. Requires WPB authorization for release of motion picture film by manufacturers.

L-179: Portland Cement, effective Aug. 23, 1942. Limits number of types of cement produced to three. Prohibits earmarking of any bins for particular customers and requires specified tests. Projects supervised by Bureau of Reclamation, TVA, and War Department are exempted.

L-180: Replacement Storage Batteries effective Aug. 29, 1942. Limits output during July 1-Dec. 31, 1942 to 90% of sales in like 1941 period and to one-half of this allowed number before Sept. 30. Users required to turn in old batteries when buying replacement.

L-182: Commercial Cooking Equipment, effective Oct. 1, 1942. Restricts use of iron and steel for some types to 75% of 1941 total; bans output of other specified types. Apply for sales authorization on PD-638A. Inventory reports must be filed by 10th of month on PD-638.

L-183: Electronic Equipment, effective Oct. 3, 1942. Prohibits production in excess of a minimum inventory required to meet deliveries on orders rated A-3 or higher, in no case exceeding 12½% of total 1941 sales. Bans transfers except on orders rated A-3 or higher. Exempts devices used in hearing aids, telephone and telegraph equipment, medical and therapeutic equipment and light and power equipment.

L-187: Cast Iron Boilers, effective Nov. 6, 1942; last amended Nov. 17, 1942. Bans after Dec. 1 production of low pressure boilers built to use oil or gas; output of other types subject to authorization by WPB on form PD-704. Manufacturers must file PD-639 by 10th of each month.

L-188: Loose Leaf Metal Parts, Aug. 3, 1943. Permits use up to 30% by weight of iron and steel used in 1941 to make blank book and loose-leaf metal parts and units. Restricts use in any calendar quarter after Aug. 4 to one-fourth of the 30% allowed. Certain styles of books and parts must be eliminated entirely.

L-190: Scales, Oct. 10, 1942. Prohibits production of household scales; commercial scales for retail trade. Limits output of clinical, mailing, parcel post

and dietetic scales to 25% of 1941 total. Bans use of brass in major parts of industrial scales and in all weights, except for analytical balances. Restricts sales. Permits production of repair parts for all scales, except household, up to 15% of production.

L-192: Construction Machinery, Nov. 7, 1942; last amended Nov. 17, 1942. Halts production for civilian use of certain types needed for armed services; all other production restricted to approved schedules. Civilian purchases and use of new equipment Schedule A for private account permitted only under specific WPB authorization. Private owners must register 30 days prior to sale, lease or use on any other project any unit listed in Schedule A on WPB form 1159. Application to purchase made on PD-556. Production schedules, inventory reports and shipping schedules filed on PD-697 by 15th of each month.

L-193: Conveying Machinery, effective Oct. 7, 1942. Requires purchasers to file PD-681. Manufacturers must file PD-682 by 15th of Nov., showing production and delivery schedules. Places restrictions on all orders with certain exceptions.

L-196: Used Construction Equipment, effective Aug. 31, 1942. Requires all owners to register their equipment with WPB by Oct. 31, 1942, on Form 1159.

L-197: Steel Shipping Drums, effective Sept. 14, 1942, last amended Oct. 23, 1942. Prohibits use of new or used drums for packing specified list of products. Manufacturers must stamp "X" on bottom of drums made after Sept. 30. Prohibits sale or delivery of new drums after Sept. 13; new or used drums without "X" after Nov. 6.

L-201: Tire Chains, effective Oct. 31, 1942. Use of metal restricted to low carbon steel. Bans metallic plating. Restricts sizes and types.

L-203: Combat Measuring Instruments, effective Oct. 13, 1942. Prohibits sales of specified types unless authorized. Purchases must apply on PD-674. Manufacturers must file PD-675 and PD-676.

L-204: Telephone Sets, effective Oct. 17, 1942. Bans production of civilian telephone sets after Nov. 15. Manufacture of repair or replacement parts unaffected.

L-206: X-Ray Equipment, effective Oct. 20, 1942. Prohibits manufacture of any models or types other than those listed in Schedule A, used principally by Army and Navy. Sales restricted to specified government agencies or those authorized after filing PD-556. Exempts X-ray tubes, accessories, parts for maintenance and repair; used and rebuilt equipment.

L-208: Gold, effective Oct. 8, 1942; last amended Nov. 19, 1942. Prohibits production of gold after Dec. 7, 1942, and breaking out of new ore after Oct. 15, except by mines assigned serial numbers under P-56. Certain small mines exempted. Prohibits sale or disposal of any machinery or equipment of the types listed in schedule A of order P-56, from a non-essential mine without specific permission of WPB.

L-209: Wire Cloths, effective Nov. 4, 1942. Prohibits any pulp or paper mill from increasing its inventory of wire cloths held in stock for a machine unit above the number specified in an official schedule.

L-211: NE Steel Products, effective Oct. 23, 1942; last amended Nov. 12, 1942. Limits sizes, shapes, and sets up specifications of concrete reinforcement steel, wheels and tires, barbed wire, wire fencing, poultry netting.

L-214: Medical Equipment, effective Oct. 24, 1942. Authorizes issuance of schedules establishing simplified practices. Restricts materials used in production and subsequent disposition.

L-217: Construction Machinery, effective Nov. 17, 1942. Denies use of alloy steel in manufacture of scrapers, other than those listed on schedules approved by WPB for which it may be used until Dec. 15, 1942. After Dec. 15, use of alloy steel prohibited in production or assembly or scrapers or repair parts, except for use in power control units, prime movers and antifriction bearing.

L-230: Military Arms, effective Nov. 16. Prohibits sale, transfer or delivery of all military arms, except to a governmental agency; for export on an authorized export license; with specific authorization of WPB; or non-operating arms to a scrap dealer who in turn may sell to a smelter. Rifles, pistols and shotguns not covered unless they are automatic models.

Priorities Regulations

Priorities Regulation No. 1. Defense orders must be accepted unless impossible because of previous defense orders, or if buyer will not conform to established prices, or if orders specify delivery within 15 days and such delivery would require termination before completion of an existing production schedule. Delivery under defense orders must be made before other orders, but no earlier delivery date shall be specified in any defense order than required by the schedule of the person placing the order. Material obtained under allocation or preference rating may be used only for the purpose specified. Inventories must not be increased beyond current needs. Records must be kept for not less than two years of inventories of material covered by preference orders and details of all transactions in such materials. Records are subject to inspection by WPB. Effective Aug. 27, 1941. Amendment, effective June 26, 1942, gives delivery preference on orders of same rating to first order received, if necessary to meet specified delivery, even though earlier delivery specified on second order.
Amendment, Aug. 10, places AA-1 and AA-2 ratings at same level, replaces latter by AA-2X.

Priorities Regulation No. 2, effective Sept. 9, 1941. Makes all preference ratings mandatory and legally enforceable. Validates rating assignments when stamped by Priorities Director on face of application.

Priorities Regulation No. 3, effective Feb. 2, 1942, last amended Oct. 3, 1942. Permits application or extension of any preference rating by use of following certification: "The undersigned purchaser hereby represents to the seller and to the War Production Board that he is entitled to apply or extend the preference ratings indicated opposite the items shown on this purchase order, and that such application or extension is in accordance with Priorities Regulation No. 3 as amended, with the terms of which the undersigned is familiar." Rescinds provisions of existing orders requiring buyer to furnish copies of rating orders or other special certifications, except for provisions of Priorities Regulation No. 9. Permits non-PRP units to extend ratings for operating supplies up to 10% of cost of production materials to which same ratings extended during same month.

Priorities Regulation No. 4, effective Jan. 26, 1942. Validates all preference rating certificates issued by Division of Priorities, OPM, to continue effective until expiration or until cancelled by Director of Industry Operations, WPB.

Priorities Regulation No. 5, effective Feb. 5, 1942. Reproduction of all priority forms and orders permitted, with following exceptions: PD-3A, P-25-a through P-25-e, P-26-a through P-26-e, and P-35 may be reproduced only for purposes of information and marked "Specimen Copy" P-3, P-4, P-9-a through P-9-g, -13, P-15, and P-52 may be reproduced only by or for producers not suppliers) operating under said orders. Reproduction of P-41 limited to persons to apply the rating.

Priorities Regulation No. 6, effective Feb. 11, 1942. Abolishes Priorities Critical List of Army and Navy Munitions Board as limitation upon application of ratings assigned by various preference orders.

Priorities Regulation No. 7, Feb. 17, 1942. Permits use of facsimile signature when assignment or extension of preference ratings requires endorsement on purchase orders.

Priorities Regulation No. 8, March 16, 1942, discontinues reports on various PD forms.

Priorities Regulation No. 9, effective April 25, 1942. Governs issue and use of ratings for exports. Ratings assigned may not be applied without export license or other authorization to export. PD-1A used to apply for ratings until forms approved for each type of export product.

Priorities Regulation No. 10, issued June 1, 1942. Provides for establishment of Allocation Classification System, consisting of symbols designating type of purchaser and end use of products included in orders on which symbols indicated. Revoked Nov. 6, 1942. Copper Branch still requires "end use" information from brass mills, copper wire mills and copper foundries before making allocations.

Priorities Regulation No. 11, issued June 10, 1942. Last amended Nov. 16, 1942. Requires adoption of PRP (See P-90) by all companies, plants or divisions of a company maintaining a separate inventory whose past or anticipated quarterly receipts or withdrawals from inventory of specified metals aggregate $5000 or more.
Excepted are: United States or other government agencies (not including those engaged in manufacture, such as shipyards, prison factories, etc., which are subject to the requirements); companies or persons engaged in: public utility service, mining or quarrying, petroleum industry, communication, non-manufacturing or non-processing of materials, processing ores or scrap into raw metal, construction.
Amendment, June 19, 1942, exempts from regulation metal mills which do not buy more than $5000 worth of metal quarterly for maintenance, re-Pending receipt of authorization, applicants may apply or extend ratings to 40% during first month of quarter and 70% during entire quarter of anticipated quarterly requirements. Exemption, Aug. 20, allows PRP unit to accept delivery of any material not included on Materials List No. 1 of fourth quarter PD-25A, or of any material exempted from inventory restrictions by order M-161. PRP units may extend ratings served on them (including certain AAA's) instead of authorized ratings to obtain materials not in materials list. Requires PRP units to rerate and reduce outstanding orders to amounts and ratings authorized, within seven days after receipt of quarterly certificate.

Priorities Regulation No. 12, issued June 26, 1942. Provides for rerating war orders and application of new series of ratings—AAA, AA-1, AA-2, etc., all of which take preference over A-1-a. AA rating abolished, all such ratings being changed to AA-2. PD-4X is form used by government agency to rerate deliveries of war materials to be made directly to it; PD-4Y is Rerating Certificate used by manufacturer to rerate deliveries to be made to him, after his deliveries are rerated by war agency. Amendment, Aug. 10, permits rerating extension for small amounts of operating supplies; allows companies under PRP to revise rating pattern of purchase orders twice monthly.

Priorities Regulation No. 13, effective July 7; last amended Nov. 17, 1942. Provides uniform rules governing sales of idle or excess materials, including distress liquidation sales. Sales for authorized uses, on ratings of AA-2X, of single lots of carbon steel of more than 5 tons are permitted. Sales from reported inventories must be reported to WPB and Copper Recovery Corp. for copper; WPB, care of Steel Recovery Corp., Pittsburgh, for steel.

Priorities Regulation No. 14, effective July 8, 1942. Provides that when Army, Navy and Maritime Commission are excepted from restrictions of limitation and conservation orders, exception also applies to corresponding Canadian agencies.

Priorities Regulation No. 15, issued Oct. 10, 1942. Frees all exports, including Lend-Lease shipments and unrated orders, as well as those assigned ratings by BEW ,from enduse and inventory restrictions in foreign countries. Manufacture in this country remains subject to WPB regulations.

Priorities Regulation No. 16, issued Oct. 15, 1942. Requires manufacturers to file appeals on form PD-500 in WPB's field offices for relief from restrictions imposed by following orders: L-5-c, L-6-c, L-18-b, L-21, L-21-a, L-27-a, L-29, L-33, L-49, L-59, L-62, L-64, L-73, L-77, L-78, L-80, L-81, L-83, L-84, L-91, L-93, L-98, L-104, L-108, L-131, L-135, L-136, L-161, M-11-b, M-126.

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Price Schedules and Regulations

Issued by the Office of Price Administration
Census Building, Third and "C" Streets, Washington, D. C.
Telephone Republic 7500

General Maximum Price Regulation, as amended and supplemented, issued April 28, 1942, sets ceiling prices with few exceptions for commodities and services, not covered by separate schedule, at highest levels charged during March, 1942. Exemptions include waste materials up to level of industrial consumer; zinc, lead and tin industrial residues; antimony ore, concentrates, and wastes; certain machines and parts; ethyl alcohol used in making synthetic rubber; waste materials in wood distillation; sales of armament to the government; certain goods produced under government contracts; items required in an emergency; Brazilian rock quartz crystals; all imported metalliferous ores and concentrates; imported and domestic blister copper; lead bullion; fluorspar ores.

Various supplementary orders fix maximum prices for: nickel anodes sold by platers to MRC and for same material when sold by MRC for nickel plating purposes; used gas cylinders; Indian mica splittings sold to consumers by MRC; non-strategic domestic mica sold by MRC; and calcium carbide drums. Various amendments authorize maximum price of 45c for Treasury sales of "silver ordinary"; base price of 45c for domestically-refined silver made from foreign ores and permit suppliers of semi-fabricated products and sellers of rolled gold plate or gold-filled stock. To add 36.125c per fine ounce of domestic silver contained in the article to maximum prices for identical articles made of foreign silver; permit sellers of tin base, lead base or tin-lead base solders to add to maximums 9.634c per troy ounce of silver contained; permit certain additions to silver salts prices. Special pricing formulae are provided for die casting; silicromanganese; certain carriers, storage, or terminal services; certain obsolete electrotype plates; used tin cans of size No. 10 or larger; newly-developed products, brass mill products and fabricated structural steel shapes, plates and bars when such prices cannot be established under section 2 of the Regulation; substandard ferromanganese.

No. 1—Second-hand machine tools issued Feb. 17, 1941, effective March 1, 1941; last amended Nov. 4, 1942. Maximum prices in terms of percentage of March, 1941 equivalent of new tools: Constructed before Jan. 1, 1920, rebuilt 70%, others 50%; Jan. 1, 1920-Dec. 31, 1929, rebuilt 80%, others 60%; Jan 1, 1930-Dec. 31, 1935, rebuilt 90% others 70%; Jan. 1, 1936 and after, rebuilt 95%, others 75%.

Dealers, except retailers, must be licensed.

No. 2—Secondary aluminum and scrap, effective March 24, 1941, last amended Oct. 22, 1942.

Secondary ingot, cents per lb. lots of 30,000 lbs. or more, f.o.b. shipping point: 98 per cent pure and silicon alloys 15.00; No. 12 and piston alloys 14.50; deoxidizer 13.50. Add ¼-cent for 10,000-30,000 lbs.; ½-cent 1000-10,000 lbs.; 1 cent under 1000 lbs.

Scrap, in cents per lb., f.o.b. point of shipment, for lots less than 1000 lbs., 1000-20,000 lbs. and 20,000 lbs. or over, respectively: Plant Scrap—segregated 2S clips or other 2S solids, 10.00, 11.00, 11.50; mixed clips or other mixed solids, 8.50, 9.50, 10.00; segregated borings and turnings, 7.50, 8.50, 9.00; mixed borings and turnings, 6.50, 7.50, 8.00. Obsolete Scrap—pure cable, 10.00, 11.00, 11.50; old sheet and utensils, 9.50, 10.50, 11.00; old castings and forgings, 10.00, 10.50, 11.00; pistons free of struts, 10.00, 10.50, 11.00; deduct 2 cents for pistons with struts.

Note: Above 1000 to 20,000-lb. prices apply on truck shipments or 1000-lb. to minimum carload rail shipments. Prices for 20,000 lbs. or more apply when shipped by truck, or minimum carload by rail.

Effective Oct. 16, 1942, drosses, skimmings, sweepings, savings, spatters, containing: 15% or more aluminum, 8c per pound of aluminum contained; under 15%, 1.2c per pound of material delivered. Effective Oct. 28, WPB-approved toll agreements excluded from operation of price ceilings. Details of transactions must be filed within 10 days of contract. Outstanding toll agreements must be reported by Nov. 20. Toll processors must report by 15th of each month on preceding month's transactions.

No. 3—Secondary zinc and scrap, effective March 31, 1941; amended Oct. 17, 1941, Feb. 2, 1942. Secondary zinc, cents per lb., carlots, E. St. Louis: 8.25, for prime western and poorer grades, 8.35 for selected, 8.50 for brass special, 8.75 for intermediate and higher. Producers quantity extras: 0.15c for 20,000 lbs. to carload; 0.25c for 10,000-20,000 lbs.; 0.40c for 2000-10,000. Other sellers' extras 0.65c, 0.75c, 1.00c and 1.50c respectively. New zinc clippings and trimmings (cents per lb.) 7.25, engravers and lithographers' plates 7.25; old zinc 5.75, f.o.b. point of shipment; add ¼-cent for single shipments of 10,000 pounds or more. Unsweated zinc dross 5.80; die cast slab 5.80, scrap 4.50, f.o.b. point of shipment; add ¼-cent for single shipments of 20,000 pounds or more. "Single shipment" means deliveries within 48 consecutive hours. Grades may be combined.

No. 4—Iron and steel scrap, effective April 3, 1941, last amended Oct. 10, 1942. The maximum price at which any grade of scrap (other than railroad) may be delivered to a consumer wherever located is the shipping point price plus actual transportation charges.

With certain stated exceptions the maximum delivered price shall not exceed by $1 a ton plus March 18 freight increase the nearest maximum base price in terms of transportation charges. The maximum shipping point price is found by taking most favorable basing point and subtracting the lowest transportation charge. Maximum shipping point price for No. 1 steel at Boston $15.05, at New York or Brooklyn $15.33. Minimum shipping point price anywhere is $13, except specified Gulf ports where minimum is $14. Maximum freight on any scrap shipped from New England $6.65 a ton. Brokers allowed 50-cent commission above maximum prices to consumers. No commission payable for preparation of scrap.

Base prices on open hearth grades $20, delivered consumers' plants at Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Weirton, Steubenville, Youngstown, Warren, Canton, Sharon; $18.75 Chicago, Coatesville, Claymont, Conshohocken, Phoenixville, Harrisburg, Sparrows Point; $19.50 Cleveland, Cincinnati, Ashland, Ky., Portsmouth, O., Middletown, O.; $18.25 Kokomo, Ind., Bethlehem, Pa.; $18 Duluth; $17.85 Detroit; $17 Atlanta, Alabama City, Birmingham; $16.50 Minnequa, Col.; $17, Los Angeles, San Francisco, Pittsburg, Calif.; $14.50 Seattle. For No. 1 railroad heavy melting steel add $1 to above prices at centers which are basing points for railroad grades.

No. 1 cupola cast $18 at shipping points in Montana, Idaho, Wyoming, Nevada, Utah, Arizona, New Mexico; $19 in North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas, Florida; $20 in other states and Kansas City, Kans.-Mo. Unprepared scrap, except heavy breakable cast, $2.50 per gross ton less than prepared. Unprepared railroad scrap is $3.50 less, material for compressed bundles $4 less.

No. 5—Bituminous coal, issued April 2, 1941 fixing prices at levels prevailing

March 28, 1941. Revoked May 1, 1941. See No. 120.

No. 6—Iron and steel products, issued April 16, 1941 freezing basing point prices at levels prevailing March 31, 1941; revised June 20, 1941 to establish base prices at April 16, 1941 levels. Revised Feb. 4, 1942.

Covered are iron or steel ingots, semi-finished products, finished hot or cold-rolled products and all products further finished by galvanizing, enameling, plating, coating, drawing, extruding, etc.

Basing point prices are those announced by (1) U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing point; or (2) those prices announced or customarily quoted by other producers at the same designated points. Exception: Base prices under (2) cannot exceed those under (1) except to extent prevailing in third quarter of 1940. Extras may be applied only if charged during two years prior to April 16, 1941. Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific points are deemed basing points except producers may charge governing basing point prices plus rail rates to the latter two areas where water transportation is not available. Domestic ceiling prices are the aggregate of (1) applicable basing point price (2) extras (3) transportation charges to point of delivery as customarily computed. The applicable basing point may be (1) the basing point nearest the consumer providing the lowest delivered price or (2) the basing point at or closest to the place of production or origin of shipment (provided the war emergency requires shipment to be made to place outside mills' usual market area). Contracts drawn prior to April 16, 1941 at other than Schedule prices may be continued until March 15, 1942.

Export ceiling prices may be either the aggregate of (1) domestic basing point nearest place of production (2) export extras (3) export transportation charges or the f.a.s. seaboard price of the U. S. Steel Export Co. on April 16, 1941.

Amendment, Sept. 17, 1942, fixes maximum prices for flat rolled rejects at 85% of base price and applicable extras on prime material; wasters at 75%; waste wasters at 65%, except plates which take waster price, tin plate which is $2.80 per 100 lbs. and terne plate which is $2.25 per 100 lbs.; semifinished at 85%. Transportation costs to delivery point may be added. Other off grades may not be sold at prices above levels of primes.

No. 7—Combed cotton yarn, May 26, 1941.

No. 8—Nickel scrap and secondary materials, effective June 2, 1941; last amended June 17, 1942. Maximum prices to makers on nickel and nickel alloy scrap unprepared for consumption, cents per lb., f.o.b. point of shipment:

Nickel scrap containing 98% or more nickel, not more than 0.50% copper 26.00 per lb.; 90-98% nickel 26.00 per lb. of nickel contained only. Converters (dealers) allowed 2-cent premium in selling to consumers. Shipments of 2000 lb. or more by maker or converter take ⅛-cent premium.

Ferro-nickel-chrome-iron scrap containing 20-90% nickel 26.50 per lb. of nickel contained, 8.00 per lb. of chrome. Converter's premium 1⅛-cents. Quantity extra ⅛-cent 10,000 lb. or more. Ferro-nickel-iron scrap containing 14-20% nickel 26.50 per lb. of nickel contained. Converter's premium 1⅛ cents. Quantity extra ⅛-cent 10,000 lb. or more.

Monel metal clippings 20.00 per lb.; soldered sheet 18.00; No. 1 castings, turnings 15.00. Converter's premium 2 cents. Quantity extra ⅛-cent 20,000 lb. or more. Cupro-nickel containing 90% or more combined nickel, copper, 26.00 per lb. of nickel contained, 8.00 per lb. of copper, only. Converter's premium 2 cents. Quantity extra ⅛-cent 20,000 lbs. or more.

Straight chromium-type sheets, clippings, solids $35 gross ton for 12-14% chromium, $40 for 14-18%, $40 plus 9.50c per lb. for each lb. chromium in excess of 18% for grades containing over 18% chromium. Deduct $5 ton for borings and turnings.

Secondary Monel ingots and Monel shot 27.00c per lb., copper-nickel shot 25.50c. Import prices placed at domestic levels. MRC purchases of stocks of metallic nickel frozen by M-6-b are exempt.

No. 9—Hides, kips and calfskins, June 16, 1942.

No. 10—Pig iron effective June 24, 1941, freezing prices at levels generally prevailing in second quarter of 1941. Governing basing point prices (gross tons): No. 2 foundry $25 Bethlehem, Everett, Swedeland, Birdsboro, Sparrows Point; $24 Erie, Neville Island, Sharpsville, Buffalo, Chicago, Granite City, Cleveland, Hamilton, Toledo, Youngstown, Detroit; $24.50 Duluth; $20.38 Birmingham, $22 Provo.

For basic iron deduct 50 cents from above except Provo which is not base. Birmingham base $19, Buffalo $23.

Malleable: $25.50, Bethlehem, Everett, Swedeland, Birdsboro; $24.50 Erie, Buffalo, Duluth; $24 Neville Island, Sharpsville, Chicago, Granite City, Cleveland, Hamilton, Toledo, Youngstown, Detroit.

Bessemer $26 Bethlehem, Everett, Swedeland, Birdsboro; $25 Erie, Buffalo, Duluth, Birmingham; $24.50 Neville Island, Sharpsville, Chicago, Granite City, Cleveland, Toledo, Youngstown, Detroit.

Low phos $29.50 Steelton, Birdsboro, Buffalo. High silica silveries (6.00-6.50% base) $29.50 Jackson County, O., $30.75 Buffalo. Gray forge $23.50 valley or Pittsburgh. Charcoal $28 Lake Superior, high phos. $28.50, Lyles, Tenn., low phos $33 Lyles.

Ceiling prices are aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to place of delivery as customarily computed. Exceptions: Struthers Iron & Steel Co. may charge 50-cent premium, Pittsburgh Coke & Iron Co. at Sharpsville only. Mystic Iron Works, Everett, Mass., may charge $1 above basing point prices on iron it produces, effective April 20, 1942. In the case of exports only, basing point nearest place of production may be used. Differentials: Silicon 50 cents for each 0.25 points in excess of 1.75-2.25 base. Phosphorous 38 cents for content of 0.70% and over. Manganese 50 cents for each 0.50% over 1.00%.

Amendment, effective Aug. 21, 1942, adjusts prices on shipments from Buffalo when made all-rail to points formerly supplied by barge.

No. 11—Cotton textiles, June 28, 1941.

No. 12—Brass mill scrap, effective July 22, 1941, last amended Nov. 19, 1942. Maximum prices cents per lb. f.o.b. point of shipment for heavy scrap, rod ends and turnings, respectively: Copper 10.25, 10.25, 9.50; tinned copper 9.62½, 9.62½, 9.37½; yellow brass 8.62½, 8.37½, 7.87½; 95% plus commercial bronze 9.50, 9.25, 8.75; 90-95% commercial bronze 9.37½, 9.12½, 8.62½; 80% min. red brass 9.12½, 8.87½, 8.37½; 71-80% best qual. brass 8.75, 8.50, 8.00; 5% nickel silver 9.25, 9.00, 4.62½; 10% ni. sil. 10.12½, 9.87½, 5⅞; 15% ni. sil. 10.87½, 10.62½, 5⅞. Above prices for less than 15,000 lbs. any kind or grade; add ¾ cent for 15,000-40,000 lbs. shipped at one time, 1 cent 40,000 or more. Ceilings may be exceeded through addition of duty on imported metal.

Buyers of specially prepared brass mill scrap, other than a brass mill, a brass and bronze ingot maker or a copper smelter or refiner may be granted by letter a special price upon application.

No. 13—Douglas fir plywood, May 1, 1941.

No. 14—Raw silk, Aug. 2, 1941. Revoked Feb. 19, 1942.

No. 15—Copper, effective Aug. 12, 1941; amended Aug. 28, 1941, Feb. 1, 1942. Maximum base prices for electrolytic, lake or other fire refined copper in wire bars or ingot bars made to meet ASTM specifications B5-27 for electrolytic and B4-27 for lake 12.00c lb. delivered in carlots Connecticut valley. Casting copper in wire bars or ingot bars fire refined to 99.5% purity, including silver as copper, 11.75c lb., f.o.b. refinery in carlots, 12.00c in less carlots.

Apply usual delivery differentials for other points. Add ⅛-cent on l.c.l. lots of electro, lake or fire-refined purchased from producers. Prices are gross before deduction of discounts and include commissions.

For other kinds, grades, shapes, forms apply customary premiums or discounts in effect Aug. 11, 1941. Other than producers (dealers) may charge following premiums, casting copper excepted: 0-499 lbs. 2c; 500-999 1½c; 1000-4999 1c and 5000 to carload ¾c.

No. 16—Raw sugar, Aug. 14, 1941.

No. 17—Pig Tin, effective Aug. 16, 1941. Last amended June 22, 1942. Prices ex New York dock or warehouse for foreign tin, ex producers plant for domestic; Grade A 99.80% or higher, 25.00c lots of 5 tons or more. Grade B 99.75-99.79% inclusive and 99.80% or higher not meeting Grade A specifications, 51.62½c; Grade C Cornish refined (99.808%); 51.62½c; Grade D 99.00-99.74% pure, inclusive, 51.12½c; Grade E below 99%, 51.00c for tin content. For 2240-11,199 lbs. incl., add 1c; 1000-2239 incl. 1½c; 500-999 incl. 2½c; under 500 lbs. 3c. Following premiums over maximum prices are allowed for export sales: 1c per lb. on 11,200 lbs. or more; 1½c on 2240-11,199 lbs.; 2c on less than 2240 lbs. Cost of packaging and other legitimate charges may be added. Premium for special shapes 7 lbs. or less is 1¼c per lb.; no premium over 7 lbs.

No. 18—Burlap, effective Aug. 16, 1941.

No. 19—Southern pine lumber, Sept. 5, 1941.

No. 20—Copper and Copper Alloy Scrap, other than of brass mill origin (see No. 12), revised schedule as amended, effective Aug. 17, 1942. Prices in cents per pound, f.o.b. shipping point, including all commissions and service charges, grouped for quantity differentials: Group 1—No. 1 wire and heavy copper, 9.75, No. 2 copper wire and mixed heavy 8.75, light copper 7.75; Group 2—Bell metal 15.50, high grade bronze gears 13.25, babbitt lined brass bushings 13.00, red trolley wheels. 10.75, No. 1 tinned copper wire 9.75, bronze paper mill wire cloth 9.50, soft red brass 9.00, soft red brass borings 8.75, aluminum bronze gears 9.00, red

brass breakage 7.50, unlined standard red car boxes 8.25, lined standard red car boxes 7.75, cocks and faucets 8.00, yellow brass castings 6.25; Group No. 3—Clean fired rifle shells 8.25, old rolled brass 7.75, brass pipe and admiralty condenser tubes 8.00, Muntz metal condenser tubes and plated rolled brass sheet, pipe and reflectors 7.50; Group No. 5—Automobile radiators 7.00. Prices on refinery brass, comprising Group No. 4; lead-covered and insulated wire and cable, in group No. 1; high grade bronze and borings and high lead bronze and borings in Group No. 2 are all determined by special formula. Following special preparation premiums may be added, except on sales to copper refiner or brass ingot maker: Crucible shape and briquetting, 1¼-cents on No. 1 wire, No. 1 tinned wire, No. 1 heavy and 1-cent on No. 2 wire and mixed heavy; Special use, 1¼-cents on copper scrap except also to foundry or brass mill; Crucible shape, 1¼-cents on copper alloy scrap. These preparation premiums may not be added if either of the following quantity premiums are added: ¾-cent for 60,000-pounds of one group, except No. 4 and No. 5; ½-cent for 40,000 pounds of one or two groups. Sellers and buyers must keep detailed records of all transactions. Consumers must file reports on Revised forms 120:7a and 120:7b by the 10th of each month covering each receipt of scrap on which settlement was made during preceding calendar month. Order does not apply to conversion of railroad scrap.

No. 21—Formaldehyde, effective Aug. 20, 1941.

No. 22—Pennsylvania grade crude oil, effective Aug. 23, 1941. Pennsylvania Bradford crude per barrel $2.75; Southwest Pennsylvania crude $2.40; Eureka $2.34; Southeastern Ohio $2.30; Oil City-Titusville, group A $2.68.

No. 23—Rayon grey goods, Aug. 24, 1941.

No. 24—Washed cattle tail and winter hog hair, issued Aug. 16, 1941.

No. 25—Fats and oils and their products, effective Aug. 29, 1941, revoked Feb. 23, 1942.

No. 26—Douglas fir lumber, Oct. 1, 1941.

No. 27—Anthracite coal, effective Sept. 12, 1941; revoked Sept. 18, 1941.

No. 28—Ethyl alcohol, effective Sept. 15, 1941.

No. 29—By-product blast furnace and foundry coke, effective Oct. 1, 1941, amended Feb. 7, 1942. By-product foundry coke f.o.b. cars at ovens: Alabama $8.50; Chicago $11.50; Ashland, Ky., Ironton, O., Portsmouth, O., Fairmont, W. Va. $10, Detroit, Buffalo, Erie, Pa., Philadelphia $11.75; Kearny, N. J. $12.15; Painesville, O. $11.25; Chattanooga, $9; Milwaukee $12.25. Delivered prices: Chicago, Detroit, Erie $12.25; St. Louis and East St. Louis $12.25 ($12.75 for producers outside Missouri, Alabama, Tennessee); Indianapolis, Terre Haute $12; Buffalo $12.50; Cincinnati $11.75; Cleveland $12.30; Philadelphia $12.38; St. Paul, Minn. $14; New England $13.75, provided freight from Everett not over $3.10, less 15 cents for cash ten days. Amendment defines areas governed by specific oven prices.
By-product blast furnace coke: 75 cents net ton above weighted average f.o.b. oven price in first quarter 1941. Does not apply to sales or shipments at less than $6 f.o.b. after Sept. 18, 1941.

No. 30—Waste paper sold east of the Rocky Mountains, effective Dec. 15, 1941. No. 1 mixed $14 net ton, f.o.b. point of shipment

No. 31—Acetic acid, effective Sept. 29, 1941.

No. 32—Paper Board sold east of Rocky Mountains, effective Oct. 1, 1941. Maximum delivered prices per net ton: Single Manila Lined board $60, chipboard $45, white patent coated news board $75.

No. 33—Carded cotton yarns, Oct. 6, 1941.

No. 34—Wood alcohol, effective Oct. 10, 1941.

No. 35—Carded gray and colored yarn cotton goods, effective Oct. 21, 1941.

No. 36—Acetone, effective Oct. 27, 1941, last amended Oct. 3, 1942. Revised prices effective Oct. 3, 1942, in cents per lb. delivered in Eastern territory, (add ½-cent for Western territory): 7.0 in tank cars, 8.5 carloads in drums, 9.0 less carloads in drums. Eastern territory includes New Mexico, Colorado, Wyoming, Montana and states east thereof.

No. 37—Normal Butyl Alcohol (butanol), effective Oct. 27, 1941, last amended Oct. 3, 1942. Revised prices effective Oct. 3, 1942, in cents per lb. delivered in Eastern territory (add ½-cent for Western territory): 14.5 in tank cars, 15.5 carloads in drums, 16.0 less-carloads in drums. Territories same as in No. 36. Add 1 cent for butyl acetate.

No. 38—Glycerine, effective Nov. 10, 1941. Base maximum prices of 11.50c per lb. for crude glycerine (80 per cent glycerol) and 18.00c per lb. for refined type.
Amendment, Oct. 16, provides licensing control.

No. 39—Upholstery furniture fabrics, effective Nov. 10, 1941.

No. 40—Builders hardware, effective Nov. 19, 1941. Maximum prices for manufacturers and jobbers are highest levels prevailing during 15-day period ended Oct. 14, 1941. Includes insect screen as well as such items as knobs, locks, hinges, etc. Steel insect screen eliminated, Jan. 16, 1942.
Amendment, Oct. 21, provides licensing control.

No. 41—Steel castings, effective Dec. 1, 1941. Maximum prices are those prevailing on July 15, 1941. Amendment, Feb. 3, 1942, places ceiling for railroad specialties at Oct. 1, 1941, levels. Amendment, effective March 16, 1942, permits producers of railroad specialty castings to charge for certain extras, coupler repair parts and pattern costs customarily charged between Oct. 1-15, 1941.
Amendment June 25, 1942, permits addition of extra freight cost on shipments of castings beyond foundries' normal shipping area.

No. 42—Paraffin Wax, effective Dec. 1, 1942.

No. 43—Used steel drums and pails, Dec. 1, 1941, amended Jan. 10, Feb. 2, June 10, 1942. Reconditioned units, 14-16 gal., $1.45; 29-33 gal., $1.85; 50-58 gal., $2.25, delivered within 50 miles of reconditioning plant. For each 75 miles or fraction add transportation cost, or 5, 7½ or 10 cents, respectively, for three capacity classifications. Further addition of 15, 25 or 50 cents allowed in California, Washington and Oregon. Reconditioned lined drum suitable as food container takes 15, 20 or 25 cent premium. Maximums for raw used drums bought direct from emptier $0.75, $1 or $1.25. Add 10, 20 or 40 cents in California, Washington and Oregon. When bought from other than emptier, raw used drum maximums are $1, $1.30 or $1.60. If buyer makes own pickup deduct 5, 7½ or 10 cents. Add 10, 20 or 40 cents if raw used drum bought and delivered or picked up in California, Washington or Oregon. Raw steel pails and covers 2, 3, 5-gallon, are 10, 15 and 20 cents; without covers 5, 7, 10 cents; covers 3, 4, 5 cents; reconditioned pails 31, 36, 45 cents.

No. 44—Douglas fir doors, Dec. 10, 1941.

No. 45—Asphalt or tarred roofing products, effective Dec. 12, 1941.

No. 46—Relaying rails, effective Dec. 2, 1941. Maximum price for rails 35 pounds or heavier originating from Class I railroads, switching or terminal companies, $28 per gross ton, f.o.b. any station on the railroad. Dealers or jobbers may charge $30 in resale. Originating other points $30 minus lowest rail freight to base nearest shipping point, but no less than $24. Basing points are Boston, Philadelphia, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, Savannah, Ga., Norfolk, Va., Duluth, St. Louis, Birmingham, Houston, Los Angeles, San Francisco, Portland, Oreg., Seattle, Denver. Maximums on warehouse sales $35.84 a gross ton in carlots for 45-60 lb. rails, $39.20 for 35-45 lb. rails. Operation of recognized warehouse must be declared to OPA by Dec. 10, 1941. Contracts made before Feb. 7, 1942 at not over $1.60 per 100 lbs., warehouse, for 25 tons and over may be filled if completed by March 15, 1942. Buyers of 100 tons or more must report to OPA.

No. 47—Old rags, effective Dec. 9, 1941.

No. 48—Flashlights, batteries, bulbs, effective Dec. 10, 1941. Maximums are highest prices quoted Oct. 1 to Dec. 1, 1941. Revoked, Feb. 4, 1942.

No. 49—Iron and Steel Products at Resale, effective Dec. 15, 1941, amended Jan. 30, Feb. 2, 1942. Fixes prices generally at levels prevailing April 16, 1941. For cold-drawn and seamless tubing use prices charged by National Tube Co. distributors; for tool steels Crucible Steel Co. prices. For less-carload lots of standard nails, annealed and galvanized wire for local delivery use mill carload price (minus 15c jobber allowance) add carload freight to warehouse, plus additions of 50c for nails, 60c for annealed wire, 68c for galvanized wire. For outside delivery add less-carload freight. Markup on export sales of all products is limited to 5% for agents, 10% for merchants.
Amendment, March 31, 1942, allows sellers of merchant wire products at least a 20% mark-up over mill carload delivered prices. Establishes following freight allowances for products sold on Pacific coast to reflect wartime use of all-rail shipments: 75 cents per 100 lbs. on plates, 65 cents on hot and cold rolled sheets, 45 cents on structurals and galvanized sheets, 25 cents on hot-rolled strip, 20 cents on hot rolled merchant bars. Also clarifies status of retailers and sets up simpler procedure for seeking exemption to schedule.
Amendment, Sept. 4, establishes maximum prices for NE steels as the mill price plus analysis extras and 66 2/3% of aggregate of base price and mill analysis extras.
Amendment, Oct. 1, 1942, transfers ex-

port price control on distressed and stranded material to order No. 13.

No. 50—Green coffee, effective Dec. 11, 1941.

No. 51—Cocoa Beans and Butter, Dec. 11, 1941.

No. 52—Pepper, effective Dec. 11, 1941.

No. 53—Fats and Oils, effective Dec. 13, 1941.

No. 54—Douglas Fir Peeler Logs, effective Dec. 20, 1941.

No. 55—Second hand textile bags, Dec. 16, 1941. Replaced March 30, 1942, by new schedule setting prices according to size of bag and weight of material.

No. 56—Reclaimed rubber, Dec. 20, 1941. Maximums are highest prices received Nov. 5 to Dec. 5, 1941.

No. 57—Wool floor covering, Dec. 16, 1941.

No. 58—Wool, wool tops, yarns, Dec. 18, 1941.

No. 59—Kapok, Dec. 18, 1941.

No. 60—Direct consumption sugars, effective Dec. 22, 1941.

No. 61—Leather, effective Dec. 29, 1941. Maximum prices are highest prevailing levels between Nov. 6 and Dec. 6, 1941.

No. 62—Cigarettes, effective Dec. 30, 1941.

No. 63—New Rubber Tires & Tubes, effective Jan. 5, revised April 25, 1942.

No. 64—Domestic cooking and heating stoves, effective Jan. 5, 1942. Maximums for regular line stoves are 112% of lowest price quoted by manufacturers from Jan. 15 to June 1, 1941. For private brands maximums are 112% of lowest price charged during same period.

No. 65—Resale of floor coverings, effective Jan. 5, 1942.

No. 66—Retreaded, Recapped Tires, effective Jan. 19, 1942. Establishes maximums for retreading, full capping, or top capping with different grades of camelback and varying tread depth.

No. 67—New machine tools, effective Jan. 21, 1942. Maximum prices for dealers and manufacturers are Oct. 1, 1941 lists or, in absence of such list, last price at which similar articles sold between Jan. 1 and Oct. 1, 1941.
Amendment, June 23, 1942, permits sales and deliveries at above ceiling prices pending OPA ruling on petitions for approval of such prices.
Amended, March 13, 1942, to permit Niagara Machine & Tool Works, Buffalo, to exceed its Oct. 1, 1941, list prices for three machine tools which it manufactures. Amendment, March 28, 1942, grants exemptions on certain tools to Stokerunit Corp., Milwaukee; Fox Grinder Inc., Pittsburgh; Niagara Machine & Tool Works, Buffalo. Amendment, April 7, authorizes Norton Co., Worcester, Mass., to raise price of 150 Model No. 26 Hydrolap machines from $7025 to 7290 each. Defiance Machine Works, Defiance, O., permitted to sell 100 Model 112-21" at $1600 each, 50 Model 200-26" at $2062 each. Exceptions granted April 21 to Gould & Eberhardt and Cleveland Automatic Machine Co.

No. 68—Hide glue stock. Jan. 20, 1942.

No. 69—Primary Lead, effective Jan. 15, 1942. Maximums in cents per pound in carloads delivered St. Louis: Pigs—Common lead 6.35; corroding lead 6.45; chemical lead 6.45; copperized lead 6.40 when made from common lead, 6.50 when made from corroding lead. Ingots or Special Shapes—⅛-cent higher for each grade. New York prices 15 points above St. Louis; Chicago district 5 points; Detroit, Philadelphia, Cleveland-Akron 15; Pittsburgh, Connecticut, Boston, Springfield, Worcester 20.

No. 70—Scrap and secondary lead, effective Jan. 15, 1942. Maximum scrap prices f.o.b. point of shipment are determined by deducting from the maximum prices for common lead at various basing points the following: .55c for soft, hard and cable lead scrap and .65c for battery lugs and lead content of lead covered copper cable. Maximum secondary prices f.o.b. point of shipment, carlots, determined by applying following differentials to basing points for common primary pig lead: Low grade pig (minus 99.73%) deduct .15c; low grade ingots, linked ingots, other special shapes add .10c; high grade (99.73% plus), base price; high grade ingots, linked ingots, other special shapes, add .50c. Amendment March 31, 1942, raises antimonial lead to 15¼ cents per pound of contained antimony. Revises method of computing maximum prices for battery lead plates by requiring assay for only lead and antimony content. Amendment, July 13, fixes prices for copper content of lead-covered copper cable in accordance with Schedule No. 20. Amendment, July 27, extends schedule to cover antimonial lead down to 0.25% antimony content.

No. 71—Cadmium, effective Jan. 19, 1942, last amended Oct. 26, 1942. Maximum prices for primary and secondary metallic cadmium per pound delivered are 95c for anodes, balls, discs and other special or patented shapes, 90c for bars, ingots, pencils, pigs, plates, rods, slabs, sticks and other regular straight or flat forms. Amendment, June 22, 1942, sets maximum for 5 lbs. or less in containers at highest level in October, 1941. Sellers may use adjustable pricing contracts.

No. 72—Fuel oil (Bunker C and No. 6 grade), effective Jan. 9, 1942. Revoked March 26, 1942.

No. 73—Fish meal, effective Jan. 20, 1942.

No. 74—Animal product feedingstuffs, effective Jan. 20, 1942.

No. 75—Dead-Burned Grain Magnesite, effective Jan. 28, 1942. Maximum prices per ton, f.o.b. Chewelah, Wash., are $22 in bulk, $26 in bags or sacks. Westvaco Chlorine Products Corp. may charge regular California customers $10 higher from Patterson plant or from stocks at Permanente. Westvaco may charge Vanadium Corp. of America and Mathieson Alkali Works $40.50, f.o.b. Patterson. For export and $7.50 a net ton when packed in double jute sacks, $12.50 in wooden barrels.

No. 76—Hide Glue, effective Jan. 28, 1942.

No. 77—Beehive Furnace Coke, effective Jan. 26, 1942. Maximum for this grade produced in Pennsylvania $6 per net ton, f.o.b. cars ovens, Connellsville, Pa. Does not apply to foundry coke.
Effective Aug. 12, 1942, operators of hand-drawn ovens using trucked coal may charge $6.50.

No. 78—Oxalic acid, effective Feb. 2, 1942. Maximum prices for carlots in cents per lb., f.o.b. producer's shipping point, for crystalline oxalic acid, 11¼ in containers of more than 290 lbs., 11¾ in containers of 100-290 lbs. Powdered acid 1 cent higher.
Amendment, March 31, 1942, exempts reagent grade from schedule provisions.

No. 79—Carbon tetrachloride, effective Feb. 2, 1942.

No. 80—Lithopone, effective Feb. 2, 1942. Maximum prices cents per lb. delivered in bags in carlots in New Mexico, Colorado, Wyoming, Montana and eastern states: Normal 4.25; high strength barium, calcium 5.60; high strength magnesium 5.75; titanated 5.60; zinc sulphide 8.25. Add ¼-cent for less carlots. Prices other states ¼-cent above eastern territory. Amendment Feb. 27, 1942, permits non-manufacturing dealers and exporters to fill, at higher than ceiling prices, contracts made prior to Feb. 2, 1942. Affects only lithopone on hand or in transit Feb. 2. Detailed reports on such deliveries must be furnished OPA within ten days.
Amendment, Oct. 16, provides licensing control.

No. 81—Primary Zinc, effective Jan. 29, 1942. Maximum carload prices in cents per lb., f.o.b. E. St. Louis, Ill.; Prime western 8.25; selected 8.35; brass special 8.50; intermediate 8.75. High grade and special high grade are 9.25, delivered. Producers may add 0.15c for 20,000 pounds to carlots, 0.25c for 10,000-20,000 pounds, 0.40c for 2000-10,000 pounds, 0.50c for less than 2000 pounds. Other sellers may add 0.65c, 0.75c, 1.00c and 1.50c for respective quantities.
Amendment, March 13, 1942, requires producers to file with OPA copy of all toll agreements; smelters must file agreements involving zinc made to other than listed specifications which are revised in the amendment.

No. 82—Wire, Cable and Accessories, effective Jan. 29, 1942. Last amended July 22, 1942. Includes hot rolled black or cleaned rods for electrical uses, and copper, copperclad or copper alloy wire used for conducting electricity. Maximum prices are manufacturers' and wholesalers' net prices on Oct. 15, 1941, with specified exceptions. Weatherproof wire prices figured against base price of 17.5 cents. For material containing lead, add number of pounds of lead times 0.325c.

No. 83—Radio Receivers and Phonographs, effective Feb. 9, 1942. Manufacturers' maximum prices are highest net prices received Oct. 15, 1941, or in preceding three-month period. OPA must approve prices for models offered after Oct. 15.

No. 84—Parts for Radio Receivers and Phonographs, effective Feb. 9, 1942. Manufacturers' maximum prices are highest net prices received Oct. 15, 1941, or in preceding three-month period.

No. 85—New Passenger Automobiles, effective Feb. 2, 1942. Maximum wholesale prices are highest prices prevailing Oct. 1 to Oct. 15, 1941 (Feb. 2 prices for Packard and Crosley) plus lower of $15 or 1% of list price for each elapsed month after Jan. 31, 1942. Add taxes and fixed delivery charges for retail prices.

No. 86—Domestic Washing Machines, Ironing Machines, effective Feb. 9, 1942. Manufacturers' maximum prices are highest prices quoted Oct. 1-Oct. 15, 1941 (Feb. 2, 1942 prices for Apex Electrical Mfg. Co.). OPA must ap-

prove prices for models offered after Oct. 15.

No. 87—Scrap Rubber, effective Feb. 5, 1942. Maximum prices fixed at seven reclaiming centers, including geographical differentials.

No. 88—Petroleum and Petroleum Products, effective Feb. 2, 1942.

No. 89—Bed Linens, effective Feb. 2, 1942.

No. 90—Rayon Waste, effective Feb. 3, 1942.

No. 91—Tea, effective Feb. 3, 1942.

No. 92—Soy Bean and Peanut Oils, effective Feb. 4, 1942.

No. 93—Mercury, effective Feb. 4, 1942. Prime virgin mercury produced in California, Oregon, Washington, Idaho, Utah, Nevada or Arizona, $191 per 76-pound flask. When produced in Texas or Arkansas, $193. When imported from Mexico, $193, f.o.b. United States freight station nearest point of entry, including duty. Other imports $191, f.o.b. port of entry. Agent's selling commission limited to 1% of maximum price. Amendment, effective Feb. 10, 1942, permits dealers with stocks on hand or in transit Feb. 4 to deliver such stocks until March 2, 1942, at prices necessary to meet contracts made prior to Feb. 4. Verified statement of such transactions must be filed with OPA.
Amended March 17, 1942, to permit dealers to split with another dealer or broker the 2 per cent premium allowed.
Amendment, Oct. 21, provides licensing control.

No. 94—Western Pine Lumber, effective Feb. 15, 1942. Maximum prices generally are those prevailing during period Oct. 1-15, 1941.

No. 95—Nylon Hose, effective Feb. 5, 1942.

No. 96—Domestic Fuel Oil Storage Tanks, effective Feb. 20, 1942. Typical prices for carload shipment of 26-inch, 16-gage steel, 275-gallon capacity tank are $17.35 in the East, $17.70 in the Midwest, $31.95 in the Far West.

No. 97—Southern Hardwood Lumber, effective Feb. 20, 1942. Cuts prices $2 to $5 a thousand feet from previous levels.

No. 98 — Titanium Pigments, effective March 1, 1942. Prices are those prevailing Oct. 1, 1941. Regular grade, 20 tons or more, delivered in bags in eastern territory, 14½c per pound. Deliveries in western territory ¼-cent higher.
Amendment, Oct. 16, provides licensing control.

No. 99—Acetyl Salicylic Acid (aspirin), effective Feb. 16, 1942.

No. 100—Cast Iron Soil Pipe and Fittings, effective Feb. 20, 1942. Prices established in terms of minimum discounts from standard revised price list. Minimum discount for 2-6 inch extra heavy pipe 52½-10-10 for carload shipments by rail or 10-ton or greater shipment by truck, 52½ for less-carload by rail or less than 10 tons by truck. Amendment, March 7, 1942, permits warehouse sellers to compute delivery charges by method employed Oct. 1, 1941.
Amendment, March 31, 1942, permits producers to compute delivered prices on emergency shipments of less than 250 pounds in same manner as warehouse shipments are determined. Amendment, June 1, 1942, establishes prices for "Victory" sizes and revises method of determining maximum prices for less carload lots of all sizes. Amendment Oct. 21 provides licensing control.

No. 101—Citric Acid, effective Feb. 16, 1942.

No. 102—Household Mechanical Refrigerators, effective Feb. 9, 1942. Maximum prices for manufacturers whose 1942 model prices were approved by OPA are net prices in effect Feb. 2, 1942. Prices of all new models must be approved by OPA.

No. 103—Salicylic acid, effective Feb. 16, 1942.

No. 104—Vitamin C, effective Feb. 16, 1942.

No. 105—Gears, Pinions, Sprockets, Speed Reducers, effective Feb. 18, 1942. Maximum prices are those in effect Oct. 15, 1941. Prices of special items not made before are to be computed on basis of Oct. 15, labor and material costs, using price-setting method employed on that date. Amendment, April 8, 1942, exempts manufacturers whose 1941 sales were less than $5000 from submitting monthly reports. Excludes automotive and tractor transmissions and rear axle assemblies from list of speed reducers.

No. 106—Domestic Shorn Wool, effective Feb. 28, 1942.

No. 107—Used Tires and Tubes, effective March 16, 1942. Establishes maximum retail prices varying with tread thickness.

No. 108—Nitrogen Fertilizing Materials, effective March 23, 1942.

No. 109—Aircraft Spruce, effective April 1, 1942. Maximum prices vary up to $690 per 1000 board feet, plus extras when the lumber is kiln dried.

No. 110—Household Mechanical Refrigerators (Resale), effective March 30, 1942. Ceilings are manufacturers' recommended retail price lists. Margins of wholesale distributors limited to Oct. 1-15, 1941 levels.

No. 111—Household Vacuum Cleaners (Resale), effective March 30, 1942. Ceilings are manufacturers' recommended retail price lists. Margins of wholesale distributors limited to Oct. 1-15, 1941, levels.

No. 112—Anthracite Coal, effective April 1, 1942. Freezes prices at Oct. 1-15, 1941 levels.

No. 113—Iron Ore, effective April 10, 1942. Applies to ore produced in Minnesota, Wisconsin and Michigan. Maximums are weighted average spot prices, based on Lower Lake ports delivery, at which spot sales of such ore were made during 1941 shipping season. "Escalator" clause eliminated from unexpired contracts. Maximum for ore shipped from mine idle in 1940 and 1941 is equivalent of $4.45 per gross ton, Lower Lake ports, for Mesabi Nonbessemer 51.50% iron, adjusted for grade and analysis. Base prices on other grades: Mesabi Bessemer $4.60; Old Range Nonbessemer $4.60; Old Range Bessemer $4.75; High Phosphorus $4.35. Penalties for silica and fine structure and premium for lump ore for open hearth use are those prevailing in 1941. Producers must report by 10th of month on preceding month's production and sales. Amendment July 2, 1942, excludes exchange of ore between producers from regulations, also Minnesota ore mined south of Minneapolis.

No. 114—Wood pulp, effective April 20, 1942.

No. 115—Silk Waste, April 25, 1942.

No. 116—China, Pottery, April 27, 1942.

No. 117—Used Egg Cases, April 23, 1942.

No. 118—Cotton Products, May 4, 1942.

No. 119—Tires and Tubes (Original Equipment), April 27, 1942. Maximum prices are 5% above highest levels prevailing in 1941.

No. 120—Bituminous Coal, May 18, 1942. Fixes mine prices with certain exceptions at Oct. 1-15, 1941 levels.

No. 121—Miscellaneous Solid Fuels, May 18, 1942. Fixes producers' prices at Dec. 15-31, 1941, levels.

No. 122—Solid Fuels, May 18, 1942, last amended Nov. 1, 1942. Fixes prices for dealers other than producers at Dec. 15-31, 1941 levels plus subsequent increases in purchase price.

No. 123—Wool Waste, April 28, 1942.

No. 124—Rolled Zinc Products, May 11, 1942. Fixes producers prices at Nov. 29, 1941 levels.

No. 125—Nonferrous Castings, May 11, 1942. Fixes producers' prices at Oct. 1-15, 1941 levels.

No. 126—Fluorspar, May 11, 1942; last amended Nov. 17, 1942. Fixes producers' prices at a range of $25 to $28 per short ton for metallurgical grade, according to calcium fluoride, silica content; in the western area at $32 per ton for acid grade with minimum calcium fluoride of 97½% and maximum silica of 1½%. Both are subject to freight adjustments.

No. 127—Finished Piece Goods, May 4, 1942.

No. 128—Processing Piece Goods, May 4, 1942.

No. 129—Paper, Products, Raw Materials, May 11, 1942. Fixes prices generally at Oct. 1-15, 1941 levels.

No. 130—Newsprint Paper, May 11, 1941.

No. 131—Camelback, May 11, 1941. Manufacturers' prices fixed at March, 1942 level.

No. 132—Waterproof Footwear, May 11, 1942.

No. 133—Farm Equipment, May 11, 1942. Fixes retail prices at Oct. 1-15, 1941, level.

No. 134—Road Machinery, May 11, 1942. Rental charges to user fixed at Oct. 1-15, 1941 levels.

No. 135—Mixed Fertilizer, April 28, 1942.

No. 136—Machines and Parts, effective July 22, 1942; last amended Nov. 25, 1942. Maximum prices for one specified list of new units are those in effect Oct. 1, 1941; or for another specified list, those in effect March 31, 1942. March 31, 1942 also is basing date for ton lots packed; $13.50 for less than ton lots when packed down to 200 pounds, $18 when less than 200 pounds. Premiums for crushing to specified mesh are those of April 28, 1942. Amendment, July 25, sets maximums

for 3-lb. briquettes containing 2-lb. manganese in cents per pound, f.o.b. shipping point, at 6.06 carload, unpacked; 6.31 carloads, packed; 6.56 ton lots, packed; 6.81 200-lb. to gross tons; 7.06 less than 200 lbs., packed.

No. 139—Used Household Mechanical Refrigerators, effective May 18, 1942. Establishes maximum prices for used units of various makes.

No. 140—Sanitary Napkins, May 20, 1942.

No. 141—Shearlings, effective May 13, 1942.

No. 142—Summer Seasonal Commodities, effective May 18, 1942. Sets retail prices.

No. 143—Tires and Tubes (Wholesale), effective May 18, 1942.

No. 144—Insecticides and Fungicides, effective May 18, 1942. Sets retail prices.

No. 145—Pickled Sheepskins, effective May 23, 1942.

No. 146—Appalachian Hardwood, effective May 19 and June 1, 1942.

No. 147—Bolts and Nuts, effective May 28, 1942. Maximum prices for bolts, units, screws and rivets set at Oct. 1-15, 1941, levels.

No. 148—Pork Products, May 21, 1942.

No. 149—Mechanical Rubber Goods, effective May 27, 1942. Effective June 15 on government contracts dated prior to May 18, 1942; July 1 on sales to War and Navy Departments. Maximum prices of standard industrial items are Oct. 1, 1941 levels; custom-made goods figured on Jan. 5, 1942, costs.

No. 150—Milled Rice, May 22, 1942.

No. 151—New Bags, May 25, 1942.

No. 152—Canned Vegetables, May 25, 1942.

No. 153—Women's Clothing, May 29, 1942.

No. 154—Ice, May 25, 1942.

No. 155—Central Hardwood Lumber, June 1.

No. 156—Beef Products, June 2, 1942.

No. 157—Military Textiles, Apparel, effective July 1, 1942.

No. 158—"War" Bicycles, June 5, 1942. Maximum retail prices $32.50 in East, $33.50 in Midwest, $34.50 in Far West.

No. 159—Concrete Reinforcing Bars, (fabricated) effective June 15, 1942. Allows fabricator margin of 50 cents per 100 lbs. above f.o.b. mill price. Maximum delivered price of fabricated bars in cents per lb., 2.40. Exceptions: 2.77 if bought by fabricator at Gulf basing point price, 2.80 at Pacific Coast basing point; 2.57 delivered Toledo; 2.52 in carloads delivered Detroit. Amendment, July 28, eliminates fabricators' inventory statements, simplifies procedure for determining prices for mill and random stock lengths, permits adjustable pricing, and simplifies provisions covering segregation for pricing and invoicing.

No. 160—Wooden Agricultural Containers, June 6, 1942.

No. 161—West Coast Logs, June 20, 1942.

No. 162—Sale and Rental of Used Typewriters, July 1, 1942.

No. 163—Woolen & Worsted Civilian Apparel Fabrics, effective June 22, 1942. June 29, 1942.

No. 164—Red Cedar Shingles, effective June 22, 1942. June 29, 1942.

No. 165—Services, effective July 1, revised Nov. 23, 1942. Covers various wholesale services and commercial and industrial consumers as well as wholesale services and commercial and industrial consumers as well as ultimate consumers. Permits adjustable pricing.

No. 166—Zinc Oxides. effective May 11, 1942. Maximum delivered price for carlots of leaded zinc oxides containing 35% or more lead 7.00c per lb. Premium for less-carlots ¼-cent.

No. 167—Rayon Yarn and Staple Fiber, effective June 27, 1942.

No. 168—Converted Rayon Yarn, effective June 24, 1942.

No. 169—Beef & Veal (wholesale), effective July 20, 1942.

No. 170—Anti-Freeze, effective June 30, 1942. Maximum retail prices per gallon: Permanent type $2.65; non-permanent produced from natural alcohol $1.40; nonpermanent from synthetic alcohol $1.10. Also sets manufacturers' and distributors' prices.

No. 171—Nitrocellulose Film Scrap, effective June 30, 1942.

No. 172—Apparel Industry Contractors' Charges, effective June 30, 1942.

No. 173—Wheat Millfeeds, effective July 4, 1942.

No. 174—Freight Car Materials, effective July 2, 1942. Establishes maximum prices for surplus car materials sold by one builder to another or to a railroad as the total of the following: Selling car builder's net invoiced cost or maximum price otherwise established by OPA for purchase of such material, at the time of sale pursuant to such Order No. L-97-a-1, as amended, whichever is lower; inbound freight paid by seller; direct labor costs, if any, in fabricating such material, determined on basis of labor rates of Oct. 1, 1941; and state sales or retailer's occupational tax levied on such sale.

No. 175—Rolled Glass, effective July 11, 1942. Establishes specific maximum prices for producers of rolled and wire glass, principally at Oct. 1-15, 1941 levels.

No. 176—Rotary Cut Southern Hardwood Box Lumber, effective July 11, 1942.

No. 177—Men's and Boy's Tailored Clothing, effective July 11, 1942.

No. 178—Women's Fur Garments, effective July 10, 1942.

No. 179—Pine Oil, effective July 18, 1942. Establishes maximum prices generally at October, 1941, level.

No. 180—Color Pigments, effective as of May 11, 1942. Restores maximum prices to April 1, 1942 level.

No. 181—Condensed Soups, effective July 18, 1942.

No. 182—Kraft Wrapping, July 28, 1942.

No. 183—Puerto Rico, July 20, 1942. Sets formula for pricing imported goods.

No. 184—Maine Sardines, July 23, 1942.

No. 185—Canned Fruits, July 24, 1942.

No. 186—Wooden Agricultural Containers, July 27, 1942.

No. 187—Paperboard Products, July 25, 1942.

No. 188—Manufacturers' Prices, effective Sept. 1, 1942, on sales to governmental agencies, Aug. 1 on other sales. Sets methods for determining manufacturers' maximum prices for new product lines introduced since April 1.

No. 189—Bituminous Coal sold for direct use as a bunker fuel, July 27, 1942.

No. 190—Free Cotton Linters, July 31, 1942.

No. 191—Cotton Linters, Chemical grade, July 31, 1942.

No. 192—Cresylic Acid, July 31, 1942.

No. 193—Distilled Spirits, Aug. 1, 1942.

No. 194—Alaska, effective July 30, 1942. Sets formula for pricing imported goods.

No. 195—Industrial Wooden Boxes, effective Aug. 8, 1942. Maximum prices are March 31, 1942 lists or prices based on costs applicable to that date.

No. 196—Hardwood Lumber Products, Aug. 9, 1942.

No. 197—Canned Fruits (wholesale, retail), Aug. 5, 1942.

No. 198—Silver Bullion, effective Aug. 10, 1942. Establishes maximum price for bullion in form of standard commercial bars at 35.375c per troy ounce, f.o.b. New York or San Francisco. Amendment, Aug. 31, raises price to 45.00c. Supersedes provisions of General Maximum Price Regulation.

No. 199—Lead Bullet Rod, effective Aug. 13. Maximum price is 1.10c per lb. above cost to producer of required metal ingredients. Differential for inexperienced producers is 1.25c for first 200 tons of rod made.

No. 200—Rubber Heels, Sept. 1, 1942.

No. 201—Virgin Island, Aug. 17, 1942. Sets formula for pricing imported goods.

No. 202—Brass, Bronze Ingots, Aug. 19, 1942; last amended Nov. 14, 1942. Maximums are 12.25c for 85-5-5-5; 16.50c for 88-10-2; 16.75c for Navy "G"; 14.75c for Navy "M"; 14.25c for 80-10-10; 10.00c for yellow; 15.75c for aluminum bronze; 12.75c for 60-65 manganese bronze; 15.50c for silicon bronze. Maximums for special "trade name' ingots are peak prices in carload lots in effect March 31, 1942, less 10%.

No. 203—Vitamin A, effective Aug. 20, 1942.

No. 204—Idle or Frozen Materials, effective Aug. 20, 1942. Last amended Nov. 3, 1942. Establishes formulas for pricing such materials sold under Priorities Regulation No. 13.
Establishes MRC prices for idle or frozen stocks of tin oxide and tin anodes; iridium, iridium alloys and iridium-containing scrap; copper-base alloy products, including insect screening; cadmium.

No. 205—Sulphate of Ammonia, effective Aug. 22, 1942.

No. 206—Vitrified Clay Sewer Pipe, effective Aug. 22, 1942.

No. 207—Canned, Preserved Foods, Aug. 24, 1942.

No. 208—Staple Work Clothing, Aug.26, 1942.

No. 209—California Sardines, Aug. 31, 1942.

No. 210—Fall and Winter seasonal Commodities, Aug. 31, 1942.

No. 211—Cotton Ginning, Aug. 29, 1942.

No. 212—Canned, Preserved Foods, Aug. 28, 1942.

No. 213—Coil Bed Springs, effective Sept. 7, 1942.

No. 214—High Alloy Castings, Sept. 3, 1942. Establishes maximum prices, effective Sept. 7, at levels prevailing Oct. 1-15, 1941.

No. 215—Softwood, Sept. 5, 1942.

No. 216—Railroad Cross Ties, Sept. 5, 1942.

No. 217—Walnut Gunstock Blanks, effective Sept. 17, 1942. Places such blanks under specific ceiling prices, removing them from General Maximum Price Regulation.

No. 218—Central Appalachian Wooden Mine Materials, effective Sept. 8, 1942. Sets specific maximum prices for standard and round pit posts, mine caps, wedges, cribbing block, ties, crossbars and switch ties.

No. 219—Northeastern Softwood Lumber, effective Sept. 19, 1942.

No. 220—Certain Rubber Commodities, effective Sept. 19; Oct. 19 on government and Lend-Lease orders. Establishes pricing method covering principally rubberized fabrics and protective clothing.

No. 221—Fall and Winter Knitted Underwear, effective Sept. 15, 1942.

No. 222—Northern Softwood Lumber, effective Sept. 23, 1942.

No. 223—Northern Hardwood Lumber, effective Sept. 23, 1942.

No. 224—Cement, effective Sept. 23, 1942, last amended Oct. 23, 1942. Sets up specific maximum prices for 12 districts covering sales by manufacturers within and outside their normal market areas.

No. 225—Printing and Printed Paper Commodities, effective Sept. 29, 1942.

No. 226—Preserves, Jams, Jellies, effective Sept. 26, 1942.

No. 227—Dried Fruits, effective Sept. 22, 1942.

No. 228—Flue-Cured Tobacco, effective Sept. 22, 1942.

No. 229—Rubber Footwear, effective Sept. 29, 1942.

No. 230—Reusable Iron and Steel Pipe, effective Oct. 3, establishes maximum prices at Oct. 1-15, 1941, levels. Prices for reusable oil country tubular goods in terms of percentage of jobbers' resale prices on new pipe having same diameter and weight per foot. Provides premiums for segregation and thorough reconditioning.

No. 231—Raw Spices and Spice Seeds, effective Oct. 7, 1942.

No. 232—Apple Butter, effective Oct. 1, 1942.

No. 233—Canned Apple Products, effective Oct. 5, 1942.

No. 234—Stirrup Pumps, Oct. 7, 1942.

No. 235—Manganese Steel Castings, effective Oct. 14. Establishes maximum prices for castings and products at levels prevailing in Oct. 1-15, 1941, period.

No. 236—Home Furnace Conversion Parts, effective Oct. 15, 1942.

No. 238—Food Markup Regulation, effective Oct. 15, 1942.

No. 239—Lamb, effective Oct. 8, 1942.

No. 240—Phosphate Rock, effective Oct. 19, 1942.

No. 241—Malleable Iron Castings, effective Oct. 21, 1942. Establishes maximum prices at highest price seller charged for similar castings between Oct. 1-15, 1941. If castings to be priced were not offered in this period, seller must apply pricing methods, costs, and profit margins used on Oct. 15, 1941 (with certain exceptions).

No. 242—Dried Prunes, Oct. 14, 1942.

No. 243—Dates, Date Products, Oct. 24, 1942.

No. 244—Gray Iron Castings, effective Oct. 26, 1942. Sets maximums at highest prices quoted between Aug. 1, 1941 and Feb. 1, 1942. If same or similar casting was not offered in that period, seller must apply the pricing formula and cost factors used on Feb. 1.

No. 246—Farm Machinery, effective Nov. 15, 1942. Maximums are those in effect March 31, 1942. Permits adjustments for items changed in design, specification or equipment since that date.

No. 248—Manganese Ores, effective Nov. 9, 1942. Establishes following maximum prices per long ton unit, duty paid, for domestic sales of grades other than domestic battery or chemical ores, to any private buyer: (1) Metallurgical ores, manganese 48%, iron 6%, silica plus alumina 11%, phosphorus not over 0.18% on dry basis, 85c, Mobile and New Orleans; 90c, Norfolk, Baltimore, Philadelphia and N. Y.; 96c, Fontana, Pueblo, Provo; (2) For battery and chemical, other than domestic: a) highest charged for March deliveries; b) if no deliveries, highest quoted list price; c) price approved by OPA if not determined under a) or b).

No. 251—Construction of Buildings, effective Nov. 5, 1942. Establishes ceilings equivalent of those generally in effect during March, 1942, adjusted for increases in labor costs between March 31 and July 1, 1942. Every contract over $500 must be reported to OPA within 10 days of award.

No. 258—Chrome Ores, effective Nov. 9, 1942. Base prices per ton are: $43.50, 48% metallurgical-chemical, f.o.b. railroad cars at N. Y., Philadelphia, Baltimore, Charleston, Portland, Tacoma, with special price for Montana ores; $31, lump refractory ore in bulk, f.o.b. Baltimore, Philadelphia, Chester, San Francisco; $35.55, lump refractory, packed in single cloth sacks, $40.80 in barrels, f.o.b. Baltimore, Chester, Plymouth Meeting; $36.50, ground refractory, 24 mesh or coarser, f.o.b. Baltimore, Chester or Plymouth Meeting, Pa.

No. 261—Finishing Builders' Hardware, effective Nov. 13, 1942. Establishes maximum prices at highest prices received by manufacturer for delivery between Oct. 1, 1941 and March 31, 1942. Establishes percentage markups which may be added to actual cost of materials under each contract held by persons other than manufacturers.

No. 272—Cast Iron Boilers, Radiators, effective Nov. 23, 1942. Establishes maximum prices at levels generally 5% below prevailing prices in case of boilers; 12% below in case of radiators. Maximums are based on Oct. 1-15, 1941, levels. Manufacturers must allow full carload rates of freight on shipments of 200 lb. or more.

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New Social Security Building, Washington, D. C.
Telephone Republic 7500

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Technical Information: E. D. Pratt
Special Products: F. B. Foley

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Pig Iron Unit: William Kerber; John Bemis, Asst.
Specialists: E. P. Buchanan, R. B. Rutter, A. D. Hannah
Scrap Unit: Alex Miller; Consultants: Marvin Plant, A. F. Danzer, J. W. Hargate, J. H. Moses, W. H. Lynn
Iron Ore Unit: S. O. Hobart
Fuel Unit: Edward Holley; Samuel Weiss, Specialist
Refractories and Fluxes Unit:

Products Section
Acting Chief: J. V. Honeycutt
Liaison Army, Navy, Maritime: R. W. Shannon
Hot Rolled Carbon Bars, Semifinished Unit: W. F. Vosmer, A. A. Wagner
Cold Finished Bar Unit: E. B. Files
Tin Plate Unit: R. F. Sentner, J. T. Nichols, J. J. Maschenic
Rail Unit: O. H. Baker, R. M. Thulean, W. H. Messner
Wire Unit: H. M. Francis, J. P. Barclay, H. E. Hartman, F. L. Downey Jr.
Warehouse Unit: J. R. Stuart, C. D. Watson, A. F. Hitchiner, C. W. Garvey, T. L. Kishbaugh
Plates and Shapes Unit: M. W. Cole, M. H. Hoffman, R. A. Marble, A. L. Meyer, W. E. Bossert, I. H. Kulp, W. J. Banning, T. H. T. Brady, H. B. Miller, H. Van Zandt.
Forgings and Castings Unit: G. F. Hocker, R. G. McElwee, A. A. Ohmer, W. S. Shiffer, H. W. Davidson, K. H. Hamblin, K. M. Hamilton, B. L. Weaver, R. H. Hoyt, W. H. Schoen Jr.
Hot Rolled Alloys Unit: W. I. Priestley, Chief; G. L. McBreen, J. F. Reid Sr.; S. A. Crabtree; J. K. Kilmer; C. R. Antony; T. S. Fitch; H. McKenney; W. E. Bryden; G. V. Fads; John Larkin.
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Sheet and Strip Unit: L. F. Miller, E. F. Clark, H. J. Barber, H. W. Davis
Distressed Stocks Unit: C. H. Bradley

Ferroalloys Branch (Building "R")
Chief: Miles K. Smith Deputy: Andrew Leith
Assistant Chief: T. C. Ford
Acting Assistant: M. T. Metzer
Assistants: R. M. Keeney, J. R. Stalker
Priority Specialists: M. H. McClement, Frederick Mechlin
Production: H. C. Carlisle, E. F. Hatch
Tungsten: J. B. Heilman
Vanadium: S. C. Stimmel
Antimony-Beryllium: H. P. Henderson, L. L. Taylor
Nickel: R. M. Keeney, J. R. Stalker, S. P. Dorsey, J. A. O'Hara
Manganese-Chrome: R. J. Rice, O. N. Rove, W. A. Hamilton, Newton Randolph, G. A. Watson, William Dunbar, Fenton McFadden

Transportation Section: E. G. Plowman, Chief

COPPER DIVISION (Building "R")

Director: H. O. King
Chief of Statistics: Francis R. Kenney
Assistant to Director: Thomas Nast
Administrative Officer: V. H. Arnold
Acting Priority Officer: J. H. Reed, L. C. Whittaker
Legal Counsel: Wm. J. Hoff, Walter Beer

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Allocations Section
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Military: E. H. Hammond Jr.
Civilian: John Douglas
Foundries, Jobbers Dealers: W. A. Meissner Jr.
Lend-Lease: W. G. Schneider

Scrap & Conservation Section
Chief: Michael Schwarz
Scrap Unit: Guy Norton, Chief
Conservation Unit (M-9-c): John Ranson, Chief
Copper Recovery Unit: J. A. Wright

ALUMINUM-MAGNESIUM DIVISION (Bldg. "R")
Director: A. H. Bunker Special Asst: T. E. Covel
Deputy Director: F. B. Cliffe
Production Section: P. D. Wilson, Chief
Construction Section: S. W. Anderson, Chief
Distribution Section: G. W. Reed, Chief
Priorities: P. D. Helser (Magnesium)
Reclamation: Carl H. Burton

Minerals Bureau

Director: Joseph M. Scribner

MICA-GRAPHITE DIVISION (Building "R")
(Mica, Graphite, Gypsum, Magnesite, Cryolite, Fluorspar, Cadmium, Bismuth, Indium, Gallium)

Deputy Director: M. H. Billings
Mica Section: S. A. Montague
Graphite Section: F. L. Wolf
Electrodes: M. H. Billings
Fluorspar-Magnesite: H. T. Mudd

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Director: Dr. W. A. Nelson
Asst. Administrators: Dr. M. H. Stow; F. S. Miller
Coal Section: D. L. McElroy, Chief
Metals Section: James Douglas, Chief
Non-metallics Section: E. W. Bauman, Chief
Mining Machy. Section: L. W. Hildreth, Chief
Smelters Section: H. E. Egolf Jr., Chief

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Mercury, Industrial Diamonds, Quartz Crystals, Platinum group metals, Radium, Uranium, Kyanite, Abrasives, Diamond Dies, Jewel Bearings)

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Jewel Bearings: Alan Magary
Non-metals: A. F. Greaves-Walker

TIN-LEAD DIVISION (Building "R")
(Lead, Tin, Ilmenite pigment, Antifriction Bearing Metals, solders)

Director: Erwin Vogelsang Deputy: S. K. Butterworth
Priority Specialists: J. A. Mirel
Mining Section: C. A. Wright, Chief; H. B. Leggett
Conservation and Distribution: Roy F. Segur, Chief; A. L. Woas, Frank Benson
Tin-Lead Scrap: I. Davis, W. L. Raup Jr.
Detinning: C. Mac Veagh
Civilian Allocation: David Schwartz

Zinc Division (Building "R")

Director: George C. Heikes Deputy: W. C. Page
Distribution Section: Myron L. Trilsch, Chief; A. H. Meuche, G. L. McRory, W. A. Huey, W. W. Hopton
PRP Section: G. L. McRory
Production Section: W. C. Page, Chief
Conservation Section: F. M. Carlson, Acting Chief; Archibald Little, H. L. Minister

Cadmium & Bismuth Section: H. J. Wolf, Chief

Commodities Bureau

Director: Ernest Reid

CHEMICAL DIVISION: (RR. Retirement Bldg.)
(Chemicals, Protective Coatings, Synthetic Rubber)
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Projects, Facilities, Machy.: J. A. Lawson, Chief
Industrial Oils: T. L. Daniels, Chief
Plastics, Synthetic Rubber: F. H. Carman, Chief
Protective Coatings: E. H. Bucy, Chief
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Priorities Section: Philip Schneider, R. P. Lund

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Deputy Chiefs: A. G. Wakeman, H. E. Whitaker

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Fibrous Glass Section: E. F. Swaim

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Deputy Chief: W. W. Fitzhugh
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Steel Drums: Charles Dailey

Construction, Utilities Bureau

Director: John Hall

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Director: A. T. Upson

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Census Building, Third and "C" Streets, Washington, D. C.
Telephone Republic 7500

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Dexter M. Keezer
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Scrap Secondary Metal: Arthur Barwick

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Scrap, Secondary Copper: Howard Chapman

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Ferrosilicon, Manganese: W. F. McKinnon

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Reusable Products: Samuel Ewing

Scrap: C. D. Scully
Warehouses: E. L. Wyman

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Lead Unit: Clarence Tow
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Fabricated Lead: C. H. Pruefer
Mixed Metals: K. L. Anderson

Zinc Products: J. G. Crost
Minor Metals: Philip Woolfson

Nonmetallic Minerals: Philip Woolfson
Research and Analysis: M. M. Bober

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Lead: C. J. Walsh (acting)
Tin: C. J. Walsh (acting)
Zinc: K. J. Rahlson

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L. S. Plummer
Ralph Hotchkiss (Prices)
Paul Gesner (Metals, Machinery)
Luther Reid (Rationing)

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RESEARCH DIVISION

Director: R. V. Gilbert

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Price Executive: Frank Beane

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Regional Admin.: Sylvan Joseph
Executive Officer: J. R. Johnston
Price Executive: James F. Bogardus

Cleveland, Union Commerce building
Regional Admin.: B. L. Williams
Executive Officer: Russell Cook
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Atlanta, Candler building
Regional Director: O. R. Strauss Jr.
Executive Officer: J. A. Short
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Regional Admin.: M. McCullough
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Chicago, 226 W. Jackson blvd.
Regional Admin.: J. C. Weigel
Executive Officer: T. K. Tindale

Denver, Kittredge building
Regional Admin.: Clem E. Collins
Executive Officer: A. H. Rosenthal
Price Executive: A. D. H. Kaplan

San Francisco, 1355 Market street
Regional Admin.: H. F. Camp
Executive Officer: F. E. Marsh
Price Executive: Norman Buchanan

Washington, Building "D"
Regional Admin.: Rupert Emerson

WPB Field Offices

Field offices of the War Production Board are listed below. These offices place no orders but provide information and engineering assistance to producers relative to WPB regulations, war contracts, and available production facilities and materials. Regional offices established in 13 cities administer activities of the various branch offices.

REGIONAL OFFICES

ATLANTA, with jurisdiction over Tennessee North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida. Regional Director, Frank H. Neely, Candler building.

BOSTON, with jurisdiction over Massachusetts, Connecticut, Rhode Island, Vermont, New Hampshire, Maine. Regional Director, Walter H. Wheeler Jr., 17 Court street.

CHICAGO, with jurisdiction over Illinois, Indiana Iowa, southern Wisconsin. Regional Director, A. T. Kearney, 20 North Wacker drive.

CLEVELAND, with jurisdiction over Ohio (except Toledo area), Kentucky, West Virginia, western tip of Maryland, western Pennsylvania (including Pittsburgh, Johnstown and Erie). Regional Director, John C. Virden, Union Commerce building, Cleveland, Telephone: Cherry 7900.

DALLAS, with jurisdiction over Texas, Louisiana, Oklahoma. Regional Director R. E. Rissey, Fidelity building.

DETROIT, with jurisdiction over Lower Peninsula of Michigan and Toledo area in Ohio. Regional Director, D. J. Hutchins, 800 Boulevard building, Detroit, Telephone: Trinity 1-5500.

DENVER, with jurisdiction over Colorado, New Mexico, Utah, Wyoming. Regional Director, Leslie A. Miller, Kittredge building.

KANSAS CITY, with jurisdiction over Missouri, Arkansas, Kansas, Nebraska. Regional Director, W. Capen Shank, Mutual building.

MINNEAPOLIS, with jurisdiction over Minnesota, North Dakota, South Dakota, northern Wisconsin, Upper Peninsula of Michigan. Regional Director, F. P. Heffelfinger, Midland building.

NEW YORK, with jurisdiction over New York and portion of New Jersey north of Trenton. Regional Director, John P. Maguire, 122 E. 42nd street, Telephone: Murray Hill 3-6805.

PHILADELPHIA, with jurisdiction over Pennsylvania (except portion in Cleveland region), Delaware, Virginia, New Jersey (south of and including Trenton), Maryland (except western tip). Regional Director, Orville H. Bullitt, Broad St. Station building, Philadelphia. Telephone: Walnut 5900.

SAN FRANCISCO, with jurisdiction over California, Arizona, Nevada. Regional Director, Harvey H. Fair, 1355 Market street, Los Angeles. Deputy Regional Director, Alexander Macdonald, 1031 South Broadway, Los Angeles.

SEATTLE, with jurisdiction over Washington, Oregon, Idaho, Montana. Regional Director, Milton H. Luce, White-Henry-Stuart building.

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Alabama
Birmingham, Phoenix Bldg.

Arizona
Phoenix, Social Security Bldg.

Arkansas
Fort Smith, Kelly Bldg.
Little Rock, Rector Bldg.

California
Fresno, Mattei Bldg.
Los Angeles, 1031 South Broadway.
Oakland, Financial Center Bldg.
Sacramento, Farmer's & Mechanic's Bldg.
San Diego, Union Bldg.
San Francisco, 1355 Market St.

Colorado
Denver, Kittredge Bldg.
Pueblo, Star Journal Bldg.

Connecticut
Hartford, 119 Ann St.
Bridgeport, 144 Golden Hill St.
New Haven, 152 Temple St.

Delaware
Wilmington, Penn Bldg.

Florida
Jacksonville, Lynch Bldg.
Miami, Congress Bldg.
Tampa, Wallace South Bldg.

Georgia
Atlanta, Candler Bldg.

Idaho
Boise, Capital Securities Bldg.

Illinois
Chicago, 20 North Wacker Drive.
Decatur, Standard Office Bldg.
Peoria, Alliance Bldg.
Rockford, Gas Electric Bldg.
Springfield, Leland Office Bldg.

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Ft. Wayne, Utility Bldg.
Gary, Gary State Bank Bldg.
Indianapolis, Circle Tower Bldg.
South Bend, 206 City National Bank Bldg.

Iowa
Davenport, Kahl Bldg.
Des Moines, Liberty Bldg.

Kansas
Wichita, Union National Bank Bldg.

Kentucky
Louisville, Todd Bldg.

Louisiana
New Orleans, Canal Bldg.
Shreveport, Giddens Lane Bldg.

Maine
Bangor, 44 Central St.
Portland, 142 High St.

Maryland
Baltimore, 1254 Baltimore Trust Bldg.

Massachusetts
Boston, 17 Court St.
Fall River, 56 North Main St.
Lowell, 8 Merrimac St.
Springfield, 1200 Main St.
Worcester, 340 Main St.

Michigan
Detroit, 7310 Woodward Ave.
Grand Rapids, Michigan Nat'l Bank Bldg.
Iron Mountain, Commercial National Bank Bldg.

Minnesota
Minneapolis, Midland Bldg.
Duluth, Christie Bldg.

Mississippi
Jackson, Tower Bldg.

Missouri
St. Louis, Paul Brown Bldg.
Kansas City, Mutual Bldg.

Montana
Helena, Power Block Bldg.

Nebraska
Omaha, Grain Exchange Bldg.

Nevada
Reno, Saviers Bldg.

New Hampshire
Manchester, Amoskeag Industries Bldg.

New Jersey
Camden, 300 Broadway.
Newark, 20 Washington Place.
Trenton, Broad Street Bank Bldg.

New Mexico
Albuquerque, 103½ West Central Ave.

New York
New York, Chanin Bldg.
Albany, 112 State St.
Brooklyn, 16 Court St.
Buffalo, 14 Lafayette Square.
Rochester, 119 East Main St.
Syracuse, 224 Harrison St.
Utica, Genesee & Elizabeth Sts.

North Carolina
Charlotte, New Liberty Life Bldg.
Raleigh, P. O. Box 2658.

North Dakota
Bismarck, First National Bank Bldg.

Ohio
Akron, First Central Bldg.
Canton, Commerce Bldg.
Cleveland, Union Commerce Bldg.
Cincinnati, Union Trust Bldg.
Columbus, 513 East Town St.
Dayton, 129 South Ludlow St.
Toledo, Security Bank Bldg.

Youngstown, Union National Bank Bldg.

Oklahoma
Oklahoma City, Key Bldg.
Tulsa, Petroleum Bldg.

Oregon
Portland, Bedell Bldg.

Pennsylvania
Philadelphia, Broad St. Station Bldg.
Allentown, 506 Hamilton St.
Chester, 12-14 East Fifth St.
Erie, Erie Trust Company Bldg.
Harrisburg, Blackstone Bldg.
Johnstown, U. S. National Bank Bldg.
Lancaster, Woolworth Bldg.
Norristown, Norristown-Penn Trust Bldg.
Pittsburgh, 1st National Bank Bldg.
Reading, 615 Penn St.
Scranton, First National Bank Bldg.
Wilkes-Barre, 53 West Market St.
Williamsport, 120 West Fourth St.
York, Yorktowne Hotel.

Rhode Island
Providence, Industrial Trust Bldg.

South Carolina
Columbia, Manson Bldg.

South Dakota
Sioux Falls, Boyce Greely Bldg.

Tennessee
Chattanooga, James Bldg.
Knoxville, Goode Bldg.
Memphis, Sterick Bldg.
Nashville, Stahlman Bldg.

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Dallas, Fidelity Bldg.
El Paso, El Paso National Bldg.
Houston, Electric Bldg.
San Antonio, Majestic Bldg.

Utah
Salt Lake City, 306 David Keith Bldg.

Vermont
Montpelier, 84 State St.

Virginia
Norfolk, Dickson Bldg.
Richmond, 10 South Fifth St.
Roanoke, 118 Kirk Ave. S. W.

Washington
Seattle, White-Henry-Stuart Bldg.
Spokane, Old National Bank Bldg.

West Virginia
Charleston, Capital City Bldg.
Clarksburg, Empire Natl. Bank Bldg.
Huntington, West Virginia Bldg.
South Charleston, Second Ave.
Wheeling, Fidelity Bldg.

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Appleton, 341 West College Ave.
Eau Claire, 128½ Graham Ave.
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Wausau, 404 Third St.

Wyoming
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Los Angeles, Western Pacific Bldg.

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Denver (Region 7: Utah, Wyoming, Idaho, Colorado, Montana, New Mexico), Kittredge Bldg.

Connecticut
Hartford, 55 Allyn St.

Delaware
Wilmington, 102 Pennsylvania Railroad Bldg.

District of Columbia
Washington (Region 9: Foreign Possessions), Temporary Bldg. D; District of Columbia, 5601 Connecticut Ave., NW.

Florida
Jacksonville, Barnett Nat'l B'k Bldg.

Georgia
Atlanta (Region 4: Georgia, Tennessee, Alabama, Mississippi, Florida, North Carolina, South Carolina, Virginia), Candler Bldg. State office, 44 Pryor St., NE.

Hawaii
Honolulu, Iolani Palace.

Idaho
Boise, Capital Securities Bldg.

Illinois
Chicago (Region 6: Iowa, Wisconsin, Illinois, North Dakota, Nebraska, South Dakota, Minnesota), 226 W. Jackson Blvd.

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Louisville, 700 Kenyon Bldg.

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Augusta, 151 Water St.

Maryland
Baltimore, Baltimore Trust Bldg.

Massachusetts
Boston (Region 1: Maine, New Hampshire, Vermont, Connecticut, Massachusetts, Rhode Island), 17 Court St. State office—10 Post Office Square.

Michigan
Detroit, Penobscot Bldg.

Minnesota
St. Paul, First Nat'l B'k Bldg.

Mississippi
Jackson, Standard Life Bldg.

Missouri
St. Louis, 640 Paul Brown Bldg.

Montana
Helena, Placer Hotel.

Nebraska
Lincoln, 625 Stuart Bldg.

Nevada
Reno, 285 S. Virginia St.

New Hampshire
Concord, 15 Capitol St.

New Jersey
Newark, 20 Washington Place.

New Mexico
Albuquerque, 320 W. Central Ave.

New York
New York City (Region 2: New York, New Jersey, Maryland, Delaware, Pennsylvania, District of Columbia), Empire State Bldg.

North Carolina
Raleigh, 227 E. Edenton St.

North Dakota
Bismarck, Harvester Bldg.

Ohio
Cleveland (Region 3: Ohio, Indiana, Kentucky, Michigan, West Virginia), Union Commerce Bldg. Columbus, 68 E. Gay St.

Oklahoma
Oklahoma City, 440 Key Bldg.

Oregon
Portland, Bedell Bldg., 520 S. West Sixth Ave.

Pennsylvania
Philadelphia, Broad Street Station Bldg.

Puerto Rico
San Juan, Stop 9, Ponce De Leon Avenue.

Rhode Island
Providence, Hospital Trust Bldg.

South Carolina
Columbia, Liberty Life Bldg.

South Dakota
Pierre, 115 E. Dakota Ave.

Tennessee
Nashville, Stahlman Bldg.

Texas
Dallas (Region 5: Texas, Kansas, Oklahoma, Missouri, Louisiana, Arkansas), Fidelity Bldg. Fort Worth, Fort Worth Club Bldg.

Utah
Salt Lake City, Atlas Bldg.

Vermont
Montpelier, Pavilion Hotel.

Virgin Islands
St. Thomas, Charlotte Amalie.

Virginia
Richmond, Schmidt Bldg.

Washington
Seattle, White-Henry-Stuart Bldg.

West Virginia
Charleston, 217 Peoples Bldlg.

Wisconsin
Milwaukee, Plankinton Bldg.

Wyoming
Cheyenne, 600 E. Twenty-fifth St.